



Case Study: Southern Boobooks and Anticoagulant Rodenticides

What are anticoagulant rodenticides?

Anticoagulant rodenticides are rat and mouse poisons which act as blood thinners and are one of the most common methods of controlling unwanted rodents. Unfortunately, studies in other parts of the world have shown that these poisons – especially the longer-lasting “second generation” anticoagulant rodenticides – can harm wildlife when they eat poisoned rats and mice. Because second generation anticoagulant rodenticides take a long time to break down, even if an animal doesn’t get a lethal dose from the first poisoned mouse it eats, the poison can build up in its body over time as it eats additional poisoned mice and eventually reach levels high enough to be fatal. Despite many studies overseas, very little research has been done to understand how anticoagulant rodenticides impact native animals in Australia.

Why study boobooks?

As part of an ongoing study at Edith Cowan University, 55 Southern Boobooks (*Ninox novaseelandiae*) were tested for exposure to eight different anticoagulant rodenticides which are used in Australia. These poisons accumulate in the liver shortly after they enter the body and some can stay there for months. This means that liver tissue is needed to test for long-term exposure. Obviously, owls need their livers to survive, so it was necessary to use road-killed boobooks or ones which died after being brought to wildlife care centres.

Boobooks were used in this study because they are common across Australia and would provide a large enough number of samples across multiple habitat types. Using a common and widespread species allows other scientists to repeat this study elsewhere in Australia and compare their findings to this study. Having a large number of samples gives additional certainty that any patterns in rodenticide exposure are not just a coincidence. Boobooks also provide a good model for understanding of how these rodenticides might have already affected other rarer species which are already mostly gone from the Perth Hills.

How are boobooks affected?

In the Perth Metropolitan area and residential areas of the Perth Hills, almost 90% of boobooks tested positive for some amount of rodenticide exposure. A few individuals tested positive for as many as five different rodenticides. About 17% of all boobooks from these areas had high enough levels of rodenticide to potentially kill them. Almost all of the rodenticides detected were the longer-lasting second generation anticoagulant rodenticides.





Only two boobooks showed exposure to a first generation anticoagulant rodenticide. In both boobooks, the amount detected was so low it would not be likely to cause any harm. Most of the rodenticides detected in boobooks are available to the public at supermarkets and hardware stores and are commonly used to control rodents around the home. However, a small number of boobooks were exposed to rodenticides which are used mostly by pest control services in commercial or industrial buildings. Interestingly, none of the boobooks from large patches of bushland or agricultural areas had any detectable rodenticide exposure.



Photo (left): This boobook was captured in Perth to take samples for disease testing and genetic analysis. Seven months later, it was found dead of rodenticide poisoning. Source: Paula Strickland.



Photo (right): This boobook was found dead far from any roads in an area where a strong second generation anticoagulant rodenticide is used. Bleeding on the feet and around the beak suggests that it may have been killed by eating prey poisoned with rodenticide. Source: Michael Lohr.

Because the boobooks used in this study were found already dead, it is possible that this study overestimates the proportion of boobooks which are exposed to rodenticides. If they were already moving slowly or feeling sick due to the rodenticide, the poisoning may have made them more likely to get hit by a car or injured. However, boobooks which receive a lethal dose of the poison are likely to die in their hollows or in bushland areas where volunteers are unlikely to find them. This means the study may actually have underestimated the number of boobooks which are killed outright by rodenticides. Although the study is still ongoing, it is clear that the use of anticoagulant rodenticides in residential areas of Perth and the Perth Hills is leading to secondary poisoning in boobooks.

What's next?

In July 2017, testing is about to begin on an additional batch of boobook liver samples. Some of these samples will fill in gaps in areas where no boobooks have been tested. Some are also from agricultural areas, and will help determine whether rodenticide poisoning is as much of a problem outside of residential areas. In the future, testing of additional species, especially ones that are already rare or endangered will help in understanding whether these rodenticides are a threat to the recovery of these species. Testing species of animals which the owls feed on will also help explain exactly how the rodenticides move up the food chain and create a clearer picture of which other species could be affected.

