THE USE OF DOGS TO DETECT CARPET BEETLES (*Anthrenocerus australis)*

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Abstract

This study examined the ability of domestic dogs (*Canis familiaris*) to detect the scent of carpet beetle larvae (*Anthrenocerus australis*). These insects were introduced to New Zealand and are now a pest of woollen carpets and fabrics in this country. The use of detector dogs can help with earlier discovery and identification of infested areas and thus reduce the use of pesticides.

Sixteen harrier hounds were available for this study, however only six dogs were selected for the actual trials after initial training. There were four trials, in which the dogs had to detect four different stimuli (dog food A, carpet beetle larvae, cockroaches and dog food B). Each run evaluated whether the dog could identify the target pottle out of six pottles. The other five pottles were empty. A dog completed six runs each day over five days for food A and over three days for the other three stimuli. Therefore there were a total of 30 runs for food A and 18 runs for the rest of the stimuli. A run was considered successful when the dog found the target pottle on the first try (i.e. first pass around the circle) without any false positives (sitting at a pottle that did not contain the stimulus).

The dogs were able to identify dog food A and B with an average success of 74.5% and 78.9% respectively. The detection rate for dog food was significantly higher than would be expected if the dogs were selecting pottles at random ($z \geq 1.64$, $p < 0.05$). However they were unable to identify either the carpet beetle larvae or cockroaches, with an average success of only 27.7% and 45.5% respectively. These results indicate that the dogs were incapable of detecting carpet beetle larvae. This could be due to several reasons such as dog breed, learning inflexibility, handler influences and methodology. The dogs used may have not been the best choice for this experiment, however they were chosen based on availability. The dogs were trained first on food before the insect trials, hence they may not have been able to create a new association between the reinforcer and insect stimuli. The handler and her techniques may have influenced the dogs to select the target pottle unintentionally (e.g. longer pauses at the target pottle) as there was a higher success rate for formal tests compared to blind tests (in which the handler did not know where the target pottle was) ($Z = -3.5$, $p = 0.0005$).

Future studies could look at the ability of other dog breeds to detect carpet beetles. More research should be done on the effects of temperament in scent detection dogs. Future research could investigate if detector dogs can differentiate between different carpet beetle species and if they are able to detect carpet beetles in the field (i.e. in museums or houses).

Contents

Chapter 3 Methods

Chapter 4 Results

Chapter 5 Discussion

List of Figures

List of Tables