

Smell you later - the repelling effect of secondary plant compounds against water voles and common voles

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Water voles (*Arvicola spec.*) and common voles (*Microtus arvalis*) are abundant in most parts of Germany and are known to cause enormous damage in fruit growing and horticulture as well as in agriculture.

There is a clear need for sustainable measures to manage vole damage. This study aimed to develop a vole repellent on the basis of secondary plant metabolites. A prerequisite for the future repellent is that the plant species required for obtaining the active substance would need to be widely available and sustainable in their production. Potentially an effective water vole repellent could help reduce crop damage but also minimise the use of kill traps and rodenticides. An additional effect would be the reduction of impacts on non-target species. In this project voles were exposed to various secondary plant metabolites (pure substances and essential oils) to study their repulsive olfactory effect on the animals.

The effect of volatile substances on water voles was tested in a T-maze. The voles could choose between a test box including a test substance and a control box without odour. The substances were considered to be a potential repellent if the test box was avoided. Three essential oils, pepper oil (black) (Mann-Whitney-U-test, $p=0.005$), geranium oil (Chinese) ($p=0.046$) and onion oil ($p=0.046$) as well as one pure plant compound (methyl nonyl ketone, $p=0.006$) repelled voles. Different combinations of these substances did not significantly increase the repelling effect compared to the use of single substances. The two most effective single substances, pepper oil (black) and methyl nonyl ketone, are currently being tested in enclosure and field trials with water voles and common voles. Recent results of these trials testing the effect of burrow application with foam and spray carriers will be presented.