

Anticoagulant rodenticides: exposure and residues in non-target rodents and their predators

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The use of first and second generation anticoagulant rodenticides to control rodent pests is widespread. The delayed action of anticoagulant rodenticides (ARs) causes a potential risk for predators that ingest poisoned rodents (secondary poisoning). Moreover, non-target rodents and other small mammals may also inadvertently feed on bait (primary poisoning). Studies from other countries (e.g. U.K. and New Zealand) indicate that ARs are transferred through the food chain, but due to the different regional conditions and farming practices these studies can only be used as an indicator for Germany, where systematic research on the exposure path of ARs does not exist. One aim of our study is to analyze the contents of ARs in target species, non-target rodents and owl pellets, as an example of non-target exposure to predators. To investigate this question experiments are carried out on farms close to Muenster (North-Rhine Westphalia, Germany), where barn owls (*Tyto alba*) and/or little owls (*Athene noctua*) are present. From both links of the potential food chains (target rodents – predators/ non-target rodents - predators) samples are taken. To assess AR exposure of owls, we collect spit pellets of barn owls and little owls. Rat snap traps are placed on rat trails or at places with potential rat occurrence on farms. Mouse snap traps are set in two transects extending from the farm to explore the relationship between distance from bait and poison distribution in non-target rodents. Using HPLC, fresh pellets and liver samples of rats and mice will be analyzed in terms of contents of eight ARs (brodifacoum, bromadiolone, chlorophacinone, coumatetralyl, difenacoum, difethialone, floucomafen and warfarin). AR-residues within the food chain and composition of the predators' prey will be used to assess the potential risk that the two owl species may ingest poisoned prey. The potential of different rodent species (target and non-target) to induce secondary poisonings will also be analyzed. The composition of owl food is analyzed by identifying rodent craniums and invertebrates within the pellets. First data of our fieldwork will be presented. An overview of further work including records of AR-residues in predators found dead in Germany will be given. (This study is funded by the German Federal Environment Agency grant number 3710 63 401.).

Keywords: anticoagulant rodenticides, Germany, non-target, owl, rodent, secondary poisoning