Frequently asked Questions about Rodenticide Baits

Q & A: Fishers & Rodenticide Exposure

A collaborative project with the following groups:

This document is intended to serve as a quick reference guide for biologists, managers and interested parties who may be asked questions regarding recent findings of rodenticide exposure in fisher and other wildlife species.

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What are anticoagulant rodenticides (AR)? They are chemicals incorporated into baits to control rodent pests. ARs inhibit the enzymes responsible for recycling of vitamin K, which ultimately reduces the production of certain blood clotting factors. Animals that consume a lethal dose die due to internal hemorrhaging.

How is wildlife being exposed to these compounds? Wildlife can be exposed either by directly consuming AR baits (primary exposure) or by consuming prey items, usually rodent species that have consumed the AR bait (secondary exposure).

What types of AR are you testing for? We are testing for both first and second generation ARs which include warfarin, coumachlor, brodifacoum, bromadiolone, difethialone, chlorophacinone, and diphacinone.

Is the test sensitive and can you have a false positive or negative result? The sophisticated analytical methodology (liquid chromatography–tandem mass spectrometry) used to detect AR in biological samples is specific and sensitive. There are no false "positive" test results. We have had some cases in which no AR were detected in a serum sample but were found in a paired liver sample. The reason for this is either due to serum AR concentrations below the analytical test sensitivity or persistence of AR in liver tissues after serum concentrations have become negative.

Have any fishers died due to AR poisoning? To date we have documented four California fishers that were determined to have died from AR exposure. The diagnosis was based upon the detection of AR in liver tissue and postmortem evidence of hemorrhage that could not be accounted for by other causes.

Could ARs make wildlife susceptible to certain diseases, other causes of mortality, or affect overall fitness? There is no good evidence to suggest that sublethal exposure to AR predisposes wildlife to other diseases or results in reduced survival; however, we are currently investigating this question.

Where and what are the AR sources that may be contributing to their exposure? Since ARs are readily available to both commercial and private consumers, the contributing sources may be difficult to determine. However, sources include common residential and agricultural uses.

In addition to determining exposure, what additional testing are you conducting? We are determining the specific AR compounds present and the concentration of each compound in liver samples. We are also conducting necropsies to determine if the ARs found are adversely affecting individuals.

Will you be able to use the liver concentrations from a dead individual as a tool to diagnose poisoning in other individuals? At the present time, the only way to diagnose intoxication is to detect an AR in a suitable sample and demonstrate the presence of hemorrhage on postmortem examination. At some point, we might have sufficient information to say that a certain liver concentration is unlikely to have caused an adverse effect.

How long does AR stay in a fisher? The half-life of each specific AR in fishers is currently unknown, therefore, extrapolating a time-point of exposure or duration would be premature.

Are combinations of different ARs considered more lethal? Since all of the ARs affect the same enzyme, the presence of more than one AR in an animal could conceivably have additive toxicity, although this has not been experimentally demonstrated.

What tissue(s) is considered optimal for testing? Can blood be used? Liver remains the optimal tissue for detection of ARs from dead animals. The recommended sample from live animals is whole blood or serum; however, a negative blood sample does not necessarily mean that no exposure has occurred since residues might still be present in liver tissue.

What affected prey tissue does the fisher need to consume in order to be exposed? Secondary exposure can occur by either consuming tissues of exposed or poisoned prey or by consuming undigested AR bait in a rodent's stomach.

Could an AR be transferred by a lactating mother or even transplacentally? There is some evidence in dogs that AR can pass to the fetus in utero or expose nursing neonates. However, these possibilities have not been thoroughly investigated in wildlife species.

Is there any regulatory action being taken to lessen the risk for AR exposure in wildlife or people? This year (2011), new regulations are taking effect which will decrease the availability of second generation ARs to consumers. Second generation ARs will no longer be for sale at grocery stores, hardware stores, or most other retail venues. However, professional pesticide applicators will still be able to use second generation ARs. EPA believes that these steps will significantly reduce the amount of AR in the environment, providing additional protection for wildlife from poisonings by these toxic and persistent products.

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California Department of Fish & Game

UC Davis University of California

Sierra Nevada Adaptive Management Project

USDA Forest Service