Impact on Vertebrate IPM Practices from EPA's Rodenticide Risk Mitigation Decision

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ABSTRACT: Vertebrate Integrated Pest Management programs are designed to utilize the most efficient, environmentally sound control methods, including anticoagulant rodenticides. The anticoagulant rodenticides are efficacious and relatively easy to handle, however there are concerns regarding the risks associated with rodenticides to human health and the environment. The United States Environmental Protection Agency (EPA) issued the Rodenticide Cluster Reregistration Eligibility Decision (RED) in July 1998 in response to the concerns associated with rodenticides. EPA and its stakeholders worked for 10 years developing risk assessments and mitigation plans, issuing the final Risk Mitigation Decision (RMD) on May 28, 2008. The RMD restricts retail sale of second generation anticoagulant rodenticides for commensal use, and it refers field use rodenticide registrants back to the RED, which makes those products Restricted Use. This means that all uses of field use products must be made by a certified applicator. These changes have potentially large ramifications for smaller private applicators that are generally not certified to use Restricted Use materials. The California Department of Food and Agriculture and the University of California Cooperative Extension are working collaboratively to develop curriculum to streamline the exam process for private applicators; however, there is no guarantee that this will be accepted by the Department of Pesticide Regulation.

KEY WORDS: anticoagulants, certified applicator, primary exposure, restricted use, risk mitigation decision, rodenticides, secondary exposure

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INTRODUCTION

Integrated Pest Management (IPM) is a method of pest management that incorporates all available control methods to create an efficacious, cost effective, and environmentally sensitive management program. Vertebrate IPM programs combine knowledge of target pest life cycles and available pest control methods, which can include toxic baits, fumigation, trapping, cultural methods, sanitation, and natural predators. Some of the most efficacious tools available for vertebrate pest control are rodenticides. They are frequently an essential component of comprehensive IPM programs designed to control a number of damaging pests in California including pocket gophers, ground squirrels, voles, jackrabbits, rats, and mice. Reasons for their popularity include high efficacy at controlling target species, quick application and removal times for target pests, and relatively low cost of application compared to many alternative approaches. When used according to label specifications, rodenticides pose a relatively low risk to the handler and non-target species. However, if label specifications are not followed, the risk of accidental human exposure and non-target poisoning increases. These exposures are detrimental to humans and to the environment, and they are of great concern.

Many different rodenticide products are currently registered for sale. They fall into two main categories: acute toxicants, and anticoagulants. Acute toxicants, such as strychnine and zinc phosphide, cause death after a single feeding, often within a few hours of consumption. Many of these pesticides are Restricted Use materials requiring a special applicators certificate or license to purchase and apply them. There are several exceptions to this general rule, including the below-ground application of zinc phosphide and 0.5% strychnine baits for pocket gopher control. Due to the restrictions placed on the use of these products, their use has not been as frequent as anticoagulant rodenticides.

Rodenticides containing anticoagulant active ingredients are more commonly used. The mode of action for an anticoagulant involves reducing the ability of blood to clot, so that the exposed animal succumbs to internal bleeding. There are two different classes of anticoagulants available for use: first-generation anticoagulants, and second-generation anticoagulants. The first-generation materials include warfarin, chlorophacinone, and diphacinone. The effects of these rodenticides are cumulative and require multiple feedings over the course of 3-5 days. If these toxicants are not consumed 3-5 days after they were first ingested, mortality will likely not occur. Because of this multiple feeding mechanism, first-generation anticoagulants are often considered to have the least impact on non-target vertebrates and are the only anticoagulants registered in California for use in a field setting.

In contrast to first-generation anticoagulants, second-generation anticoagulants such as brodifacoum, bromadiolone, and difethialone are more toxic and require only a single feeding to kill most target pests. However, mortality does not occur for up to 5 days post-consumption, so time to death is equivalent for both classes of anticoagulants. Rodents can continue to consume bait over the time period prior to death, increasing the potential anticoagulant build-up in body

tissues (bioaccumulation). The potential for second-generation anticoagulants to bioaccumulate in target species increases the risk for exposure to scavengers and predators. This is the main reason that restricts their use to non-field settings. In California, second-generation anticoagulants are used for rat and mouse control only in and around commercial and agricultural structures, and in residential areas.

HISTORY OF THE EPA RODENTICIDE RISK MITIGATION DECISION

The United States Environmental Protection Agency (EPA) issued the Rodenticide Cluster Reregistration Eligibility Decision (RED) in July 1998. The RED was initiated due to concerns regarding the risks associated with rodenticides to human health and the environment. Rodenticides are toxic to humans, and over the years there have been thousands of accidental exposure incidents associated with residential use. Children are particularly at risk of accidental exposure, especially children under 6 years of age, and data indicates that children in economically depressed areas may encounter higher rates of exposure. The EPA asserts that the number of exposure incidents, although rarely severe, is too high. Rodenticides also pose a threat to non-target wildlife. Birds and mammals may consume the bait directly (e.g., granivorous birds may consume exposed grain bait), which is considered a primary exposure route. Predators may also consume prey having rodenticides present in body tissues, which is a secondary exposure route. This can be seen in raptors, such as hawks, and mammals, including coyotes, foxes, mountain lions, and bobcats (EPA OPP 2008). The RED required registrants to incorporate bittering agents and indicator dyes into their formulations to address the issues associated with children and non-target wildlife (EPA OPP1998).

The EPA convened an external working group of medical doctors, industry representatives, government officials, and environmental agencies, which became known as the Rodenticide Stakeholder Working (RSW) group. The RSW was tasked with recommending ways to reduce the risk of rodenticide exposure, especially to young children. The RSW met 5 times in 1999-2000 and ultimately recommend that EPA not require the dye or bittering agent, as they may impact the efficacy of the formulations (WRIPMC 2001). The EPA adopted RSW's recommendations in November 2001 and made the addition of bittering agents and dyes voluntary, rather than a requirement. Two environmental groups, West Harlem Environmental Action and the Natural Resources Defense Council, filed suits in federal court in 2004 to make EPA reinstate the original requirements of the 1998 RED, specifically the addition of bittering agents and indicator dyes to rodenticide formulations. In 2005, District Court upheld the determination regarding the dye, but reversed the decision regarding the bittering agent, stating that EPA was "arbitrary and capricious" in its decision (Foy 2009). EPA was directed to reconsider the decision regarding not requiring bittering agents in rodenticide formulations.

In addition to the aforementioned events, EPA gathered data, performed data analysis, and drafted a comparative ecological risk assessment to further evaluate the potential for rodenticide bait products to pose ecological risks to non-target birds and mammals. This was a lengthy process, beginning in October 1999 and culminating in September 2001. The preliminary ecological risk assessment was made available for public comment in January 2003. A revised ecological risk assessment was issued in September 2004, after EPA made revisions based on comments received on the preliminary draft. EPA took comments on the revised ecological risk assessment and initiated informal consultation with the U.S. Fish and Wildlife Service for the 9 registered rodenticides in 2005. In January 2007, EPA issued a proposed risk mitigation decision for the registered rodenticide products. The proposed risk mitigation decision included measures to mitigate hazards to children and non-target wildlife. One proposal was to make second-generation anticoagulants, including brodifacoum, bromadiolone, and difethialone, Restricted Use materials for use only by certified applicators. Formulation and package restrictions were proposed for first-generation anticoagulants (chlorophacinone, diphacinone, and warfarin) and non-anticoagulants (zinc phosphide, bromethalin, and cholecalciferol) that would be available to homeowners. The EPA took over 700 comments on the proposed risk mitigation decision. The final Risk Mitigation Decision for Ten Rodenticides was issued May 28, 2008, and amended for clarification on June 24, 2008 (EPA OPP 2008).

IMPENDING CHANGES TO AGRICULTURAL AND PROFESSIONAL USE OF ANTICOAGULANT RODENTICIDES

The 2008 Risk Mitigation Decision refers registrants of field use rodenticides to the 1998 RED, which changes the classification of first-generation anticoagulants to federally Restricted Use pesticides for agricultural use (EPA OPP 1998). This means that field use rodenticides can only be applied under the supervision of a certified applicator. This is an important change, as many growers have used first-generation anticoagulants for several decades to control California ground squirrel (*Spermophilus beecheyi*), vole (*Microtus* spp.), and jackrabbit (*Lepus californicus*) populations. Such situations will soon require that a certified applicator apply these poison baits, thereby limiting their availability for use by smaller property holders. Second-generation anticoagulants will not become Restricted Use materials; however, other label changes and sales restrictions will limit access to these materials. These changes will officially be enacted on April 4, 2011. Useful information for these changes is as follows:

First-Generation Anticoagulants

All field use rodenticide labels must be amended prior to April 4, 2011, to add the federal Restricted Use designation (EPA OPP 2008). Users will have to have a certified applicator's certificate or license to field-apply first-generation anticoagulants. Common certification examples include Qualified Applicator Certificate (QAC), Qualified Applicator License (QAL), and Private Applicator Certificate (PAC). A QAC/QAL, which is

obtained from the California Department of Pesticide Regulation (DPR), allows the user to apply or supervise the application of pesticides on property other than their own, although differences exist between the three depending on purpose of the application (see the DPR website for further information; http://www.cdpr.ca.gov/). A PAC allows pesticide application only on the property of the user or supervisor and may be obtained from the local County Agricultural Commissioner's office. To obtain either one of these, one must pass an exam from DPR indicating knowledge on pesticides and pesticide regulations. A fee is required for the QAC/QAL exam, whereas the PAC is free of charge. For all certificates or licenses, Continuing Education (CE) credits must be taken to maintain all pest control certificates and licenses. The number of hours of CE required depends on the certificate or license held by the user.

A quantity restriction will be placed on the sale of first-generation anticoagulants; purchases made by professional applicators or for agricultural use must meet or exceed 4 pounds of product. This is to limit access to homeowners. For homeowners, these materials can still be purchased at retail outlets for use on commensal rodents (i.e., Norway and roof rats and house mice) in and around buildings, although purchase of these materials is limited to tamper-resistant bait stations containing ≤1 pound of product in the form of a solid wax bait block or paste bait. Pelleted or loose grain baits will not be available by retail sale for commensal use. Bait station refills may be packaged with the bait station, although total weight of bait cannot exceed 1 pound. Refills will not be sold separately from bait stations; as such, bait stations must be discarded when bait is gone and new bait stations purchased, if additional bait is needed. Bait stations will be categorized within four tiers (EPA OPP 2008):

Tier 1 – Tamper-resistant for children and dogs, weather resistant, tested according to EPA protocols, for indoor and outdoor use

Tier 2 – Tamper-resistant for children and dogs, tested according to EPA protocols, for indoor use only

Tier 3 – Tamper-resistant for children, tested according to EPA protocols, for indoor use only, or

Tier 4 – Self-certification; packaging not reasonably anticipated to release other than small quantities of bait, resistant to opening by a child <6 years old, for indoor use only, non-refillable (one-time-use only)

Anticoagulant baits will not be restricted for pocket gophers and moles, as application for these species occurs below-ground.

Second-Generation Anticoagulants

Second-generation anticoagulants are not registered for use in agricultural fields and will not be allowable for this purpose in the future. They are available for use in and around agricultural buildings (i.e., barns, dairies, etc.). This use will continue, but they will only be available in farm-supply stores and only in packages ≥8 pounds, to discourage homeowner use. Second-generation anticoagulant baits sold in this manner are only for use within 50 feet of agricultural buildings and in bait stations when applied aboveground or in outdoor settings. Bait stations are required for indoor use only when children and non-target animals have access to bait.

Professional applicators may purchase these materials in quantities of no less than 16 pounds, for use in homes and in and around agricultural buildings. Other restrictions remain the same as those for general agricultural use listed above (EPA OPP 2008).

Impacts to Vertebrate IPM Practices

These changes may have little impact on professional pest control advisors and growers with larger farms, as most of these individuals will already have some form of pest control license for controlling weed or insect pests. However, these changes have potentially large ramifications for smaller private applicators who in the past have typically used these materials. To control vertebrate pests in the future, they will either need to hire someone to apply these rodenticides, consider alternative options for control, or become a certified applicator. This certification process can be problematic for some small landowners, as these tests are strongly geared toward herbicide and insecticide applications. Tests that are more pertinent to rodenticide application could increase the availability of PACs to small landowners, while more accurately gauging their knowledge on rodenticide application. Currently, University of California Cooperative Extension and the California Department of Food and Agriculture staff are working to provide an alternative exam for rodenticide certification. The proposed approach will have to be approved by DPR prior to implementation. The concept has been presented to DPR, but there is no guarantee that it will be approved.

Until a decision is made regarding an alternate exam for rodent control, users will need to take the existing exam to become Certified Private Applicators and legally use anticoagulant baits. The concern is that many small land owners will not take the exam, and they will either forego treatment or will use other products off-label. If growers lose the ability to use a tool that is an integral part of their IPM program, they may encounter increased rodent populations. This could potentially increase the amount of damage they incur to their crops, reduce yields, and create a reservoir of rodent reinfestation for neighboring properties. In addition, increased rodent populations can impact human health, as rodents can be reservoirs and vectors of several zoonotic diseases, such as hantavirus, plague, and murine typhus. If growers decide against becoming certified, they may try home remedies that will have questionable efficacy and may negatively impact the environment. Furthermore, they may use commensal first-generation anticoagulants or purchase second-generation anticoagulants from a farm supply store and use those products off-label. Off-label uses of first and second-generation anticoagulants can pose a serious threat to human health and non-target species.

It is imperative that growers maintain legal access to the tools and methods included in a comprehensive IPM program. The changes being implemented as a result of the rodenticide RED and subsequent Risk Mitigation Decision will significantly impact the use of rodenticides.

CDFA's goal is to make the transition of field use rodenticides to federally Restricted Use products as effortless as possible for all users.

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