Potential Fiscal Impact of the Rodenticide Risk Mitigation Decision to the California Department of Food and Agriculture's Rodenticide Research Program

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Abstract: The United States Environmental Protection Agency (EPA) issued the Rodenticide Cluster Reregistration Eligibility Decision (RED) in July 1998 in response to human health and environmental concerns associated with rodenticides. The 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 applications 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, the University of California Cooperative Extension, and the California Department of Pesticide Regulation worked collaboratively to streamline the exam process for private applicators, allowing for a time-limited exam through June 2012. The concern for the Vertebrate Pest Control Research Advisory Committee (VPCRAC) is that many people will not take and/or pass the exam. This will impact the ability to effectively control rodent pests in some areas and may affect the revenue stream supporting the VPCRAC program. Preliminary sales data is not indicative of any impact to the program, but it may be too early to accurately draw any conclusions.

Key Words: anticoagulants, certified applicator, primary exposure, Restricted Use, risk mitigation decision, rodenticides, secondary exposure

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BACKGROUND

The California Department of Food and Agriculture (CDFA) (formerly the "State Commission on Horticulture") has been actively involved in the control of vertebrate pests deemed detrimental to agriculture for over 130 years. Prior to 1990, the counties involved in vertebrate pest control activities and the state acted independently of one another, with many counties holding their own rodenticide registrations. In 1990, the California Legislature created the Rodenticide Surcharge Program with the passage of Assembly Bill 2776, sponsored by the agricultural industry. The establishment of the Surcharge Program has allowed for the creation of a standardized vertebrate pest control program under the CDFA. This legislation, which created Sections 6025 through 6029 in the State Food and Agricultural Code, provided for the formation of a Vertebrate Pest Control Research Advisory Committee (VPCRAC), which is under the direction of the CDFA, and the funding and establishment of a research program by means of a per-pound assessment on vertebrate pest control materials sold or distributed by participating California counties. The surcharge is currently set at $0.50 per pound of materials sold, used, or distributed by the counties. The surcharge funds are placed into a research account at the CDFA, to be appropriated by the Secretary solely for the purpose of establishing and administering the research program. Surcharge funds are used to maintain current registrations, expand knowledge on controlling vertebrate pests, improve the use of existing materials, and to find alternative control methods and materials that are safe, humane, effective, and economical (Timm et al. 2004). To date, the surcharge has raised $10,823,215 in revenues, with 87% being used to fund $9,454,611 in research (Figure 1).

INTRODUCTION

Some of the most efficacious tools available for vertebrate pest control are rodenticides; several rodenticide products are currently registered for the

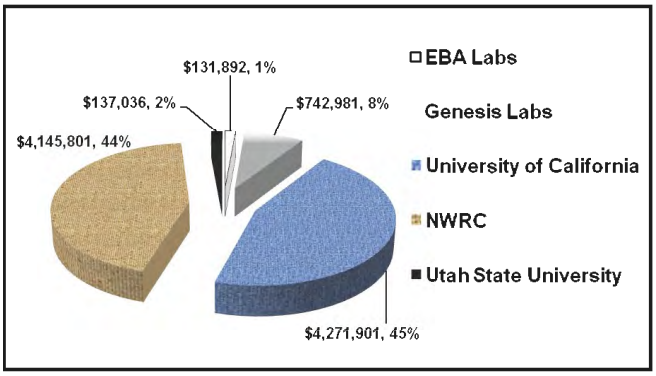

Figure 1. Research grant expenditures according to grant recipients' affiliation, 1990 to present.

control of California ground squirrels (*Spermophilus beecheyi*), voles (*Microtus* spp.), mice, rats, and similar species. These rodenticide products can be categorized into non-anticoagulants, such as zinc phosphide, which is generally acutely toxic (causing death relatively soon after a single ingestion), and anticoagulants (causing a delayed death as a result of internal bleeding). There are two different classes of anticoagulants available for use: first-generation and second-generation. First-generation anticoagulants include warfarin, chlorophacinone, and diphacinone. The effects of these rodenticides are cumulative and typically require multiple feedings over the course of 3-5 days. In contrast to first-generation anticoagulants, second-generation anticoagulants such as brodifacoum, bromadiolone, and difethialone are more toxic and more persistent, usually requiring only a single feeding to kill most target pests. For both groups of anticoagulants, mortality does not typically occur until 5 or more days following ingestion of a lethal dose. Regardless of their toxicity, rodenticides pose a relatively low risk to the handler and non-target species when they are used according to label directions. However, if labels are not followed, the risk of non-target wildlife poisoning or accidental human exposure may increase.

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 accidental exposure incidents associated with residential use. According to the RED document, children, especially young children, are particularly at risk of accidental exposure. Rodenticides also may 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 and scavengers 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).

In addition to the concern over human and non-target wildlife exposure, data gaps for efficacy, chemistry, and toxicological data were identified in the RED for specific active ingredients. The RED required registrants to produce data to fill the gaps or remove unsupported claims on their labels. The EPA gathered data including the data generated by the registrants, performed data analysis, and drafted a comparative ecological risk assessment to further evaluate the potential for rodenticide bait products that pose ecological risks to non-target birds and mammals (Erickson and Urban 2004). This was a lengthy process, beginning in October 1999 and culminating in 2005 when the EPA initiated formal consultation with the U.S. Fish and Wildlife Service for the nine registered rodenticides. In January 2007, the EPA issued a Risk Mitigation Decision (RMD) for the registered rodenticide products. The EPA took over 700 comments on the proposed RMD. The final RMD for Ten Rodenticides was issued May 28, 2008, and amended for clarification on June 24, 2008 (EPA OPP 2008). The RMD included the original nine rodenticides evaluated in the RED and additionally products containing the active ingredient difenacoum, which was federally registered in 2008, prior to the issuance of the RMD.

CHANGES TO GENERAL CONSUMER USE OF ANTICOAGULANT RODENTICIDES

The 2008 Rodenticide RMD directly impacted the general consumer (homeowner / residential) market by placing restrictions on the active ingredients available for rodenticide products marketed for general consumer use and by including packaging restrictions on the remaining products. The data that the EPA evaluated in preparation for the RMD indicated that the products containing second-generation anticoagulant active ingredients pose a greater risk to non-target wildlife than do products containing first-generation anticoagulants. Furthermore, it was stated in the RMD that: "EPA believes that misuse and overuse of rodenticides is more common among general consumers than occupational users. General consumers are less likely to accurately understand rodenticide risks, rodent behavior, the manner in which particular rodenticides work, and are less likely to read and follow label instructions correctly" (EPA OPP 2008).

Due to the hazards associated with the second-generation anticoagulant products and the EPA's concern over the potential for misuse by general consumers, the RMD directed rodenticide companies to remove all second-generation anticoagulant products from the general consumer market by June 4, 2011 (EPA OPP 2008). Several rodenticide registrants who had products that were scheduled to be removed from the consumer marketplace filed a lawsuit against USEPA regarding the processes that were being used for product cancelations. The rodenticide companies involved were successful in the litigation, which resulted in the USEPA assembling a Scientific Advisory Panel in November of 2011 to address the concerns of the rodenticide registrants. The USEPA must now formally initiate cancellations for the products involved in the litigation, extending the registrants' ability to sell their products until final determinations are made regarding each individual product cancellation.

The RMD allows the general consumer to bait "in and around" structures with products that are less likely to harm non-target wildlife. The options available to the general consumer after June 4, 2011, include products that contain first-generation anticoagulants (chlorophacinone, diphacinone, and warfarin) and non-anticoagulants (bromethalin, cholecalciferol, and zinc phosphide). These materials can be purchased at retail outlets for use on Norway rats (*Rattus norvegicus*), roof rats (*R. rattus*), and house mice (*Mus musculus*) in and around buildings, but the EPA has placed formulation, packaging, and quantity restrictions on them. According to the RED, pelleted and loose grain baits will not be available to the general consumer for the control of commensal rodents. Only solid wax bait blocks or paste bait will be available to the general consumer and the bait will be sold in tamper-resistant bait stations containing $\leq$1 lb of product. Bait station refills may be packaged with the bait station, although the total weight of bait cannot exceed 1 lb. Refills will not be sold separately from bait stations; as such, bait stations must be discarded when the bait is gone, and if additional bait

is needed, new bait stations must be purchased. Bait stations will be categorized within 4 Tiers, Tier 1 being the most resistant bait station for use indoors or outdoors, graduating down to a Tier 4 bait station, which is for indoor use only and will reasonably prevent a child under the age of 6 from gaining access to the bait (EPA OPP 2008). The formulations for anticoagulant baits will not be restricted for manual underground baiting for pocket gophers.

CHANGES TO FIELD USE AND PROFESSIONAL USE OF ANTICOAGULANT RODENTICIDES

Second-generation anticoagulants are not registered for use in agricultural fields and will not be allowable for this purpose in the future. However, products containing second-generation anticoagulants 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 packages containing at least 8 lbs of product. Second-generation anticoagulant baits sold in this manner are only for use within 50 ft of agricultural buildings. The label requires the use of a bait station when applied above ground in outdoor settings or for indoor use when children and non-target animals may have access to the bait. Professional applicators may purchase these materials, in quantities of no less than 16 lbs, for use in homes and in and around agricultural buildings. The use restrictions remain the same as those for agricultural uses listed above (EPA OPP 2008).

The 2008 RMD refers registrants of field (agricultural) use rodenticides to the 1998 RED, which changes the classification of first-generation anticoagulants to federally Restricted Use pesticides for agricultural use:
"All products labeled for field uses, except those limited to manual underground baiting, must be reclassified and relabeled as restricted use because of acute toxicity and high potential for primary and secondary risks to non-target mammals and birds" (EPA OPP 1998).

All first-generation anticoagulant field use rodenticide labels were to be amended prior to April 4, 2011, to add the federal Restricted Use designation (EPA OPP 2008). In addition to making these products Restricted Use, quantity restrictions were placed on the sale of first-generation anticoagulants; purchases made for agricultural use must meet or exceed 4 lbs of product. Professional applicators may also purchase first-generation anticoagulant products without the Restricted Use designation in packages greater than 4 lbs for all uses except field use. There are no formulation restrictions for field use or professional use products.

After April 4, 2011, all persons applying field use first-generation anticoagulants must be trained and certified to use Restricted Use pesticides. The Code of Federal Regulations and the Food and Agriculture Code state:

> "**40 CFR 171.7(b)(1)(iii)(D) FAC** 14015. Except as provided by regulation adopted by the director, a restricted material shall only be possessed or used by, or under the direct supervision of, a private applicator, who is certified pursuant to Section 14093, or a certified commercial applicator, as defined by Section 6000 of Title 3 of the California Code of Regulations (40 CFR Ch. 1, 07-01-08 Edition)."

This means that field use rodenticides can only be applied under the supervision of a certified applicator. The certifications include Qualified Applicator Certificate (QAC), Qualified Applicator License (QAL), and Private Applicator Certificate (PAC).

All 3 certifications are under the jurisdiction of the California Department of Pesticide Regulation (CDPR). CDPR administers the QAC/QAL exams for a fee, and persons passing the exam are certified/licensed to apply or supervise the application of pesticides. A PAC exam is administered free of charge by the local County Department of Agricultural and certifies the user to apply pesticides only on their own property. Continuing Education (CE) credits must be earned 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.

IMPACTS TO VERTEBRATE PEST CONTROL PRACTICES

First-generation anticoagulant rodenticides have been used for decades to control California ground squirrel, vole, and jackrabbit (*Lepus californicus*) populations. The changes associated with the Rodenticide RED require that a certified applicator purchase and apply these rodenticides, thereby limiting their availability. Smaller property owners face a significant challenge in continuing their vertebrate pest control regime, as many do not use any other Restricted Use products and are not certified applicators. Some counties estimated that there were over 300 uncertified users within their individual jurisdiction that would need to take the exam to continue using field use rodenticides. The existing PAC exam process could be problematic for some small landowners, as the exams are geared toward herbicide and insecticide applications.

To assist these small property owners in maintaining their ability to apply rodenticides, CDPR, University of California Cooperative Extension, and the County Agricultural Commissioners worked collaboratively to create a time-limited exam (available only through June 2012) that was more pertinent to rodenticide applications. The CDFA created training modules and held training sessions at different county locations immediately prior to offering the Rodenticide PAC exam, resulting in impressive exam pass rates of 78% to 89% for first-time test takers.

The concern was that even with the time-limited exam, some small landowners would not pass or even take the exam. Without becoming a certified applicator, small landowners will be at a significant disadvantage, having to forego treatment with field-use anticoagulant rodenticides. They can rely on other, generally less efficacious and less cost-effective methods of control including trapping, shooting, or exclusion. If growers lose the ability to use field-use rodenticides, which are an integral part of many vertebrate pest control programs, they may encounter increased rodent populations, leading to increased crop damage, increased control costs, and reduced yield.

A 2009 National Wildlife Research Center economic study focused on the impact of non-predator vertebrate damage to 22 crops in 10 California counties (Shwiff et al. 2009). The 10 counties included in the study incurred a mean estimated loss of $336 million dollars due to non-

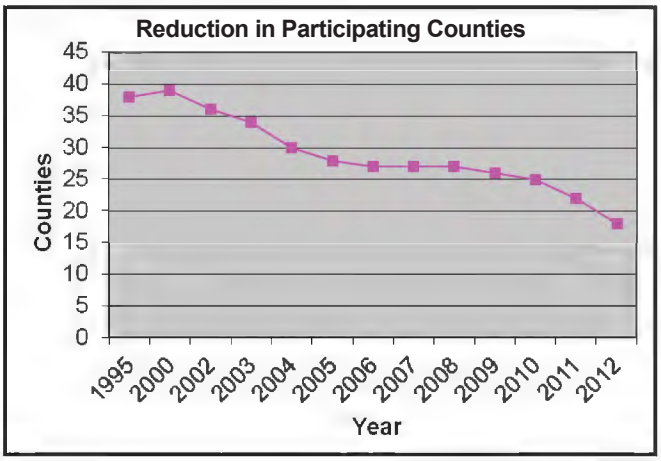

Figure 2. Change in number of California counties participating in the Rodenticide Surcharge program, 1990 to present.

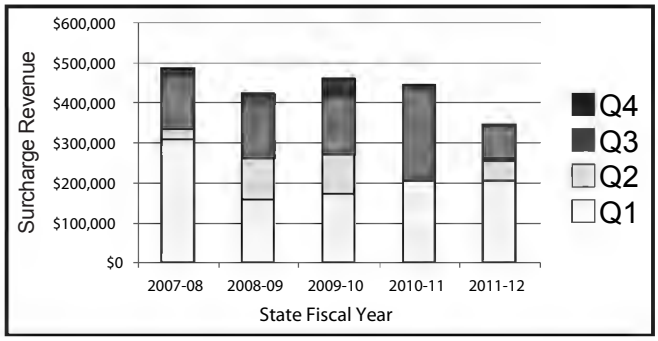

Figure 3. CDFA Rodenticide Surcharge revenues for the past 5 fiscal years, detailed quarterly (Q). Note that 4th-Quarter revenues for FY 2011/12 are not yet available.

predator vertebrates, with an estimated 2,100 to 6,300 jobs lost annually in these counties as a result of vertebrate damage. In Monterey County alone, approximately 1,000 jobs and between $44 and $128 million in revenues were lost due to vertebrate pest damage (Shwiff et al. 2009). In addition to increased control costs for growers, rodent damage may also contribute to higher prices in the marketplace. Increases in rodent populations can also impact human health, as rodents can be disease vectors. Additionally, high populations of burrowing rodents can damage infrastructure such as levees, dams, and building foundations. Furthermore, uncertified growers may, out of desperation, make off-label applications of first- and second-generation anticoagulants, which may pose a serious threat to non-target species.

FISCAL IMPACTS TO CDFA PROGRAM

Since 2003, 100% of the funding for CDFA's vertebrate control program, including staffing and overhead, has come from the rodenticide surcharge fund. Originally, the surcharge was used solely for funding research, but due to fiscal hardships with California's general fund, surcharge funds are used to fund all of the overhead costs for the program. Another issue affecting the program has been the decline in the number of counties participating (i.e., selling or using rodenticide products from which surcharges were returned to CDFA's fund supporting CDFA staff and research grants) in the VPCRAC program. In 2008, there were 27 counties participating, and currently in 2012 there are 18 participating counties, a 33% reduction in participating counties over the last 4 years (Figure 2). This is troublesome to the Committee because it affects program revenues; the total average annual revenues associated with the counties that dropped from the program are $67,237.

The reduction in participating counties also impacts the ability for individuals to purchase bait in their county. Many ranchers and growers are forced to drive hundreds of miles to procure bait from a county that remains active in the Vertebrate Pest Control program. When county staff were contacted regarding their reasons for dropping out of the program, their reasons given were overwhelmingly lack of resources, including staffing and the lack of adequate space to run the program.

Members of the VPCRAC were particularly concerned that the program would see additional reductions in sales due to historical users not being certified and not being able to purchase bait. The Committee has tracked quarterly revenues to compare revenues prior to implementing the requirements of the RED and after the implementation. Fiscal Year 2011-12 will be the program's first complete year after implementing the RED requirements. As such, the Committee has decided to review the revenue reports and the factors in addition to the RMD that may be impacting them. Figure 3 shows quarterly sales for 5 years, including the current year that is not yet closed out. Revenues appear to be relatively consistent over the Fiscal Years 2008-2011; the average in revenues over this period was $452,321, which is a reduction from previous years that included revenues of up to $800,000.

The reduction in revenues equates to a reduction in the research budget, as the overhead must be paid to maintain the program. This makes the research grant process more competitive and limits the scope of grants to projects negatively impacting the VPCRAC program. One fiscal modification the Committee is considering is reducing the duration and funding for future projects, and asking researchers to seek matching funds from other sources. If more counties drop out of the program, or if sales decrease from greater application restrictions, the program will have no choice but to reduce available funding for research projects.

The Committee is dedicated to looking for novel ways to improve revenues and to reduce overhead costs. VPCRAC staff will continue to apply for Federal, State, and private grants to infuse the program with research funds. In addition, the Committee will look for partnerships in funding projects of mutual interest to make VPCRAC funds stretch farther. If all else fails, the Committee can consider the option of raising the surcharge from $0.50 to $1.00 per pound of bait.

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