Scimetrics
Limited Corp.

November 7, 2025

To:
DPR's Public Comment Portal
https://cdpr.commentinput.com

Subject: Proposed Anticoagulant Rodenticide Mitigation Measures

In response to your Informal Public Workshop on September 24, 2025, we herewith submit following comments:

1. **Importance of Rodent Control**

Ever since the dawn of humanity rodents spread diseases such as plague, leptospirosis, Lyme disease, salmonellosis, rat bite fever, murine typhus, and many others (Meehan 1984). In addition, rodents inflict billions of dollars in economic damage to crops, irrigation systems, homes, and community property. The high reproductive rates of most rodents require a continuous system of control to keep their populations reduced.

The dramatic increase in the human populations with expanding large cities create ideal habitats for invasive species such as the Norway rat, roof rat, and house mouse. These invasive rodents stowed away on ships of the early settlers to North America coming from various parts of the globe. Not only were these invasive species destroying food and water supplies along the way, but diseases such as plague formerly endemic to Eurasia were introduced to the US. These pests rely on humans to provide food and shelter to live in close association with humans. Their genetics are programmed to live in association with man. Poor or no rodent management systems can lead to catastrophic food shortages and disease transmission to humans, wildlife, and domestic animals. Today, global warming has already had an impact on diseases. Rodents are survivors and populations will increase exponentially if left unchecked.

The founder of Scimetrics has over 50 years of laboratory and field experience with rodenticides and other means of rodent research from some 60 countries. After researching all forms of rodent control over that time and seeing firsthand the impact rodents have had in many countries, Scimetrics Limited Corp. was established in 1999 with its mission to develop FGARs to provide customers with reduced-risk products. The first compound we began working with was warfarin. Today, many of our products include an added insecticide to kill fleas and ticks on the rodent, which aids in the reduction of disease transmission.

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2. The Anticoagulant Overview

Warfarin was developed in the US for rodent control in 1948. The compound was formally approved for human use by the FDA to treat blood clots and associated blood disorders in 1954. An estimated 15 million Americans take warfarin daily to control various forms of blood clotting issues.

The US Environmental Protection Agency (EPA) was at the center of FGAR and SGAR registration approvals since that responsibility was transferred to them from the USDA after its creation on December 2, 1970. A major scientific revelation at the time was the discovery of warfarin resistance within the US. The initial awareness began in the 1972 after a publication by Jackson and Kaukeinen (1972) documented warfarin resistance to Norway rats in North Carolina. The research was theorized two years later by Books and Bowerman (1974) and generated a prevailing thought that resistance was widespread in the US. The discovery created immediate concern within the industry, public health agencies, and the EPA.

About that time SGARs were being developed to address the perceived increase in FGAR rodent resistance in Europe. SGARs were very effective against rodents that were considered resistant to warfarin, although at the time, no one considered the possible implications of SGAR widespread use. The extensive testing in US did not use DNA resistance surveys since the technology was not available at that time. The warfarin resistance dilemma communicated a mixed message to the end-users because rodent control quickly required an SGAR bait and it was assumed FGARs could not get the job done. Perceived resistance pockets varied geographically, and the thinking was that SGARs would be the solution no matter where a rodent problem existed in the US.

Resistance theories were based on flawed testing. Frantz, and Madigan (1998) first reported concern over the WHO test protocol, which had been adopted by the EPA to determine if warfarin resistance rodent labeling claims were to be used on SGARs. Briefly, that testing involved presenting a 0.005% warfarin-treated meal diet (1/5 the nominal 0.0250% concentration) to Norway rats in a no-choice test for six consecutive days and observing mortality. Any survivors were considered warfarin resistant based on the amount of bait consumed. In the Franz and Madigan study, surviving rats from their initial exposure to warfarin were maintained in the lab for a 30-day period then run through the same test again. The percent mortality in the repeat test averaged about 70%. If the surviving rats in the initial test were categorized as warfarin-resistant, then all the rodents in that study should have survived.

Basically, the test protocol was flawed yet it resulted in numerous resistance claims on the product labels. The concept was further examined by Poché and Poché

(2012) with various FGARs. See attached publication "Rodenticides: Warfarin, still a good management tool".

Furthermore, Poché (1998) examined the gut bacteria in rodents as a possible mechanism to help degrade low- dose warfarin after consumption. The warfarin dose absorbed was less than anticipated and resulted in an incurred evaluation and survival of rats as "resistance". At the time much research on human drugs was receiving attention because the effects of bacteria in the intestinal tract contributed to the breakdown of some human drugs (Hill 1995).

By the early 1980's, the use of FGARs declined dramatically and baiting with SGARs increased exponentially. SGARs began to gain attention because rodents were quickly eliminated. Brodifacoum was the first EPA-approved SGAR. This was despite the fact that EPA was aware of secondary toxicity issues from studies conducted with brodifacoum in China, Indonesia, Myanmar and Sudan in 1983. To obtain a "single-feed" label claim SGAR development had to adhere to an EPA Test Protocol that required presenting baits to rodents for a 24-hour period then observing mortality. If mortality achieved 90% or better, then the product sponsor was able to use the claim "kills a rodent in a single feeding".

In the regulatory product registration process, for an SGAR to obtain a label claim "Kills warfarin-resistant rats" data were generated following the WHO testing guidelines and data submitted and approved by the EPA. That is, the surviving rats were used in a test to prove efficacy for whatever SGAR the rodent is exposed to. The surviving rats in the screening had tolerance to 50 ppm warfarin over a 6-day exposure. These studies were not related to DNA resistance although the results were interpreted as such. Poché discussed this in 2010 (see references). Studies, conducted at Genesis Laboratories, addressed the issue by trapping Norway rats from Chicago, a known epicenter of warfarin resistance. A breeding colony was established and maintained for approximately 10 years (Poché 1998). A series of studies following the WHO protocol revealed that improved and higher purity warfarin available today was and still is very efficacious in eliminating Norway rats.

3. Combining seven anticoagulants into one group

Evaluating FGARs and SGARs in the same manner is unscientific when considering the vast differences in toxicity, half-life in tissues, environment effects, and effects on non-target animals. This is not a catch-all basket for rodent control. For example, how can DPR consider the brodifacoum half-life in plasma of 91.7 days as equal to warfarin, which is approximately 30 hours? Different active ingredients have different effects on target animals. The EPA in its discussion of ecological effects states "Information available to EPA on the acute avian toxicity of warfarin indicates that the

pesticide is practically nontoxic to game birds. In subacute studies, warfarin is moderately toxic to practically nontoxic to upland game birds and waterfowl" (EPA R.E.D. Facts Warfarin 1991).

All anticoagulants have different chemical profiles and should be evaluated that way. The potential for bioaccumulation among all anticoagulants cannot be considered equal. Adjustments to risk mitigation proposals and regulations should be made to account for those differences among the group of FGARs and SGARs.

Numerous studies on warfarin were submitted to the EPA to provide data on non-target wildlife toxicity. The following studies were submitted to the EPA to support the evidence: Mach and March (1997), Carlet and Mach (1997), Poché and Mach (2001), Baroch (2004), Davidson (2010), Poché (2010), Mach (1998) Poché (2011), Poché and Poché (2012, Poché et al (2018) Poché et al 2019(a) and Poché (2019b), These citations are in the References section of this letter.

4. Bait concentrations for anticoagulant formulations

For FGARs and SGARs in the US, concentrations may vary depending on the product formulation. For example, Scimetrics has effective baits for California Ground Squirrels formulated with 0.0025% diphacinone (EPA Reg. Nos. 72500-11 and 72500-24), while the California Department of Food and Agriculture is using a bait formulated with 0.01% chlorophacinone (EPA SLN No. CA 890024), i.e. a 4 x higher concentration than Scimetrics' products. A similar product produced by the State contains 0.01% diphacinone.

DPR should evaluate each rodenticide formulation based on the active ingredient, its concentration, half-life in tissues, and residue level in carcasses, which results in different toxicological effects. A dose makes the poison, depending on how much chemical is added (see Paracelsus, 1538) in Ottoboni, 1991). "All things are poison and nothing is without poison. It is the **dose** only that makes a thing not a poison". This is also evident with human drugs.

Lowering the dose reduces the amount of active ingredient per acre, reduces tissue residues in target field rodents, and lowers the risks to wildlife and domestic animals. The dose level of the bait can have significant difference in potential non-target species mortality.

5. Limitation of Duration of Baiting / Pulsed Baiting

The California Central Valley is currently in the midst of a severe field rodent outbreak. We also frequently hear from California residents complaining about an

explosion in ground squirrel populations due to the restrictions put in place with California assembly bills AB1322 and AB2552. Unfortunately, the decision to pass these bills was not based on science, but emotions and political lobbying by various groups. California Ground Squirrels and other rodents cause considerable damage to property, for example, home foundations, electric boxes, attics, food supplies.

A major drawback of pulsed baiting is that rodents will come back with a vengeance due to their high reproductive rates. A maximum of 3 x 35 days of baiting leaves 260 days of non-baiting, which is enough time to have a major rodent infestation due to high reproductive rates.

Pulsed baiting is a good "marketing ploy" to sell the idea of increased safety. However, compounds with extended half-lives and high toxicity will not be "safer"in the end. In addition, collecting all anticoagulant baits per site by day 35 puts an undue burden on pest control companies and operators.

6. **Conclusion:**

Rodent control is complex, and it is important to consider all tools in the tool box for a successful rodent management program. This includes the use of rodenticides. Many of the already implemented regulations in California and the newly proposed restrictions to rodenticides will contribute to fewer people being able to access products. Negative impacts of the already existing restrictions are higher expenses and reduced effectiveness of rodent control, rise in rodent populations leading to increased disease transmission to humans, and an increase in property damage. Further restrictions will increase the problems exponentially, including use of more toxic products, non-registered products being imported into the US illegally, and increase in misuse of baits.

We ask DPR to do a more thorough evaluation of the different rodent baits available on the market, and to consider the toxicity categories of each of the seven anticoagulants and their concentration levels.

We thank the DPR for considering our comments.

Sincerely,
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