

The overuse of second-generation anticoagulant rodenticides: A case for integrated pest management as a solution to rodent control

The scientific evidence now clearly shows that second-generation anticoagulant rodenticides (SGARs) pose a significant threat to wildlife and ecosystem health. The scientific community realizes and seeks to address this human-derived threat, compiling a comprehensive book¹ targeted to policy makers: “Anticoagulant Rodenticides and Wildlife: Emerging Topics in Ecotoxicology”. This book outlines the widespread wildlife exposure to SGARs and is a “must read”. As a result, I will instead focus on the practical pest management aspects of SGAR use.

If the science clearly indicates that SGARs are harmful and can destabilize ecosystems, why are they still the most used rodent control method globally¹? As the aforementioned book points out, “despite consistently failing ecological risk assessments, SGARs remain in use because of the demand for effective rodent-control options and the lack of safe and humane alternatives”¹. A lack of effective alternatives is the rationale consistently used to contest SGAR restrictions. However, from my Master’s in Pest Management training, I know the integrated pest management (IPM) solutions. I also know most pest control companies do not use IPM solutions but instead center on the use of harmful SGARs¹, in part, because of consumer demand due to a lack knowledge of SGAR damage to wildlife. Below, I expand on this evidence and conclude that SGAR use should be heavily restricted if not banned.

House mice and brown rats are global pests² in both urban^{3,4} and rural^{2,5} settings, and are hyper-reservoirs of zoonotic diseases^{3,6}. Accordingly, mice and rats necessitate intensive control efforts. “The best approach for rodent control takes an integrated pest management (IPM) approach that includes sanitation, structural exclusion, occupant education, and various methods of [non-poison] lethal control”, with the last resort being rodenticides^{1,7–9}. The IPM strategy reduces rodent populations long-term by removing the human-created environments that sustain them, including the removal of food sources and rodent-proofing buildings. IPM rodent control has been extremely effective in the past, reducing rodent populations in the applied area of Boston by 87% in 3 years^{10,11}. However, for reasons I outline below, the pest management industry rarely employs IPM measures and instead is dominated by SGARs^{9,12}.

My personal journey studying pest management illuminates this pervasive problem. I began visiting rat-infested sites where dumpsters are filled with food daily. Rats come running to the sound of closing dumpster lids like children to a dinner bell. The only fearful sight for me here, however, were the permanent SGAR bait stations lining the perimeter. The cycle was clear: attract, support, and perpetually poison rodent populations and their associated food chains. I have also visited sites with no discernable rodent problem, yet they are crawling with permanent SGAR bait stations. Turning to the scientific literature to understand my field observations, I learned that

permanent SGAR bait stations are commonly used as a ‘preventative measure’ in both North America and Europe^{1,9}. Both approaches to rodent control fly directly in the face of my graduate training in pest management. Refuse should be properly stored, and SGARs should be a last resort after all other IPM tactics are exhausted, not as a permanent or preventative solution.

Four years since learning of permanent SGAR bait stations, I have not seen a single food establishment (coffee shop, grocery store, gas station etc.) without permanent SGAR bait stations, including establishments absent of rodent presence. More worryingly, SGAR bait stations are also a staple of non-food related facilities, including libraries, apartment complexes, and even state park information centers.

Permanent SGAR bait stations are routinely deployed because SGARs are a cheap and easy rodent control measure¹³. In comparison, it must be difficult to sell IPM tactics, especially building repair, to customers. Consequently, SGARs comprise over 90% of the baits used by pest control professionals⁴. This likely explains why SGAR application levels remained unchanged in California, despite banning SGAR sales to consumers. However, “it is now recognized that large-scale use of anticoagulants may pose a global risk to vertebrate wildlife as acknowledged by international agencies and conventions (e.g., United Nations Environmental Convention on Migratory Species 2014)”¹. Banning SGARs would stop this risk. Even using first-generation anticoagulant rodenticides instead, which have a shorter half-life and a substantially lower secondary poisoning risk, would help safeguard wildlife. At minimum, SGAR use should be heavily restricted, i.e. only considered after all other IPM tactics have been exhausted. Requiring pest control companies to be IPM-certified, similar to what the EU is promoting for Europe¹, will further promote IPM for rodent control. I would like to stress here that the onus is not on pest management companies alone. Convincing customers to employ long-term solutions, such as building repairs, in lieu of seemingly cheap (at least in the short term) SGAR bait stations can be difficult. Regardless of the price tag, the environmental cost is too high. For pest management companies to effectively sell and provide IPM solutions, customers and local and state governments need to be educated about the harmful effects of SGARs.

The deployment of eco-friendly multiple-kill traps with irresistible food baits and pheromone lures would further strengthen IPM rodent control and supplant the use of SGARs. Multiple-kill traps which require only periodic maintenance would fit into current pest control business models, akin to permanent SGAR bait stations. The Goodnature A24 multiple kill trap is one such example. However, at about \$200 USD it is cost prohibitive. Therefore, investing in research and development of an affordable multiple-kill trap is warranted. As rodents are trap-shy and avoid new objects in their environment^{14,15}, the research group I am a part of has created irresistible food baits¹⁶ and sex attractant pheromone lures^{17,18}. Fitting multi-kill traps with these lures will ensure rodent entry.

With the recommendations to employ IPM solutions and ban SGARs, I look forward to seeing local governments, communities and pest management companies lead the way in addressing and solving this global problem.

Sincerely,

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