

Discovery of Anticoagulant Rodenticides Dispersed in an Illegal Marijuana Grow Site within Several Fisher Territories in Northern California

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Mourad W. Gabriel^{1,2}, J. Mark Higley³, Sean M. Matthews⁴, Greta M. Wengert^{1,2} and Robert Poppenga⁵

1: Integral Ecology Research Center, 2: University of California Davis, School of Veterinary Medicine, 3: Hoopa Tribal Forestry, 4: Wildlife Conservation Society, 5: California Animal Health and Food Safety Laboratory, UC Davis

In late June 2012 while collecting data on fishers (*Martes pennanti*), an IERC ecologist and a senior wildlife ecologist from local tribe investigated the site of three illegal marijuana gardens in a remote section of a northern California community forest. The site was known to overlap several fisher territories and was abandoned by the growers in 2011 (Figure 1a). During their brief visit to one of the three marijuana gardens, they documented the following chemicals and toxicants that potentially pose significant health risks to fishers and their prey.

Approximately 261 kg (575 lbs) of fertilizer (Figure 1b), including 91 kg (200 lbs) of fertilizer at 46% nitrogen levels were found. In addition, 11 kg (24 lbs) of snail and slug bait (Figure 1c), and 0.95 L (32 oz) of 50% Malathion (Figure 1d) were found. The site also contained approximately 680 grams (1.5 lbs) of a second generation anticoagulant rodenticide (AR), brodifacoum, which was removed. However, there were 2,948 grams (6.5 lbs)-worth of empty AR bait containers (Figure 2). Based on LD₅₀ dosage calculations for this AR for mice (*Mus musculus*) and Norway rats (*Rattus norvegicus*, Table 1: Cornell Pesticide Management Education Program, 2012; Environmental Protection Agency, 2012), the following table represents amounts of bait at standard concentrations of 1st generation and 2nd generation ARs that would kill 50% of mice or rats that ingested the toxicant (Table 2).



Figure 1: Condition and items discovered at an abandoned illegal marijuana grow site in a northern California community forest. 1A (top-left): Condition of site with scattered refuse. 1B (top-right): Several bags of various fertilizers. 1C (bottom left): One of two bags of snail and slug molluscicide. 1D (bottom right): One of two bottles of 50% Malathion.



Figure 2: Scattered refuse at an illegal marijuana grow site which included large amounts of the second generation anticoagulant rodenticide (AR) Brodifacoum, in water resistant packages. Numerous containers of the same AR were found throughout the site totaling several kilograms of AR either already consumed or broadcasted nearby. Arrows mark several of the intact AR bait containers.



Table 1: Names and generations of toxicants and their LD₅₀ dosages at standard active ingredient concentrations (in parentheses). Species and their standard weights are listed with their respective amounts of bait necessary for LD₅₀.

Toxicant	Mouse LD ₅₀ (weight: 0.025 kg:0.055 lbs)	Norway Rat LD ₅₀ (weight: 0.25 kg:0.55 lbs)
Brodifacoum (2nd Generation)	0.2 g (0.005%)	1.4 g (0.005%)
Warfarin (1st Generation)	37.0 g (0.025%)	58.0 g (0.025%)

Table 2: Names and generations of toxicants removed from a northern California marijuana grow site within several fisher territories and the respective number of rodents possibly killed at published LD₅₀ rates.

Toxicant		Probable Number of Mice Killed (based on LD ₅₀)	Probable Number of Norway Rats Killed (based on LD ₅₀)	Projected Number of Fishers Killed (based on LD ₅₀ for 5kg domestic dog)
Brodifacoum (2nd Gen) bait removed	680 g (1.5 lbs)	1700	243	1 – 4
Brodifacoum (2nd Gen) bait empty containers	2,948 g (6.5lbs)	7370	1053	3 – 17