RAT POISONS NOT ONLY KILL WILDLIFE: THEY CAN ALSO WEAKEN AND SICKEN THEM. Known “sublethal” impacts include:

- Hemorrhaging beneath the skin and extensive bruising. Internal hemorrhaging in bones, body wall, heart, and elsewhere in the body. Possible heart failure.[1]
- Hemorrhaging of the heart, liver, kidney, lung, intestines, and muscles.[2]
- Anticoagulants associated with inflammatory response and immune suppression in bobcats.[3]
- Anticoagulants associated with multiple system effects in bobcats.[4]
- Multiple AR exposure events associated with notoedric mange.[5]
- Barn owl clutch size, brood size, fledging success, and nest box occupancy lower in fields treated with bromadiolone and chlorophacinone.[6]
- Increased vulnerability to other causes of death such as vehicular collisions and predation.[7]
- Coyotes exposed to multiple FGARs and with high FGAR residues tended to be in poorer body condition.[8]
- Chronic anemia, making animals more susceptible to diseases, including mange, and other stressors. [9]
- Reproductive impacts. Female sheep exposed to anticoagulants had more aborted or stillborn lambs (up to 50%); male sheep had lower sperm motility.[10]
- Decreased food intake[11] and decreased body weight.[12]
- Neonatal transfer to young kits. Decreased resilience to environmental stressors.[13] Fetuses more susceptible to brodifacoum toxicity than adults.[14]

- Increased parasite and pathogen burdens.[15]

- Shorter wings, tails, bones, bills, and birth defects.[16]

- Rodents poisoned by anticoagulants are more likely to be eaten by predators.[17]

- Raptors may preferentially prey upon sickened rodents: The energetically beneficial behavior of favoring substandard prey may increase raptor encounters with rodenticide exposed animals if prey vulnerability has resulted from poisoning.[18]

- Exposure to brodifacoum may have prolonged effects that increase toxicity of subsequent AR exposure.[19]

- Bromadiolone and chlorophacinone residues from secondary poisoning can be transferred to the eggs of *T. alba.* [20]

- Increased stress and reduced body condition.[21]

- Chlorophacinone can affect ability of hawks to thermoregulate.[22]

- Bromadiolone exposure reduced body condition in common kestrel nestlings.[23]

- Clutch size, hatching success, and fledging success in barn owls is lower in oil palm plantations treated with warfarin and brodifacoum, relative to untreated plantations.[24]

- Male barn owls engage in greater exploratory flight and energy expenditure to secure enough prey to meet their needs, when nesting in areas treated with brodifacoum and warfarin, relative to untreated areas.[25]

- Red foxes that die from or with infectious diseases have a greater disposition to second generation anticoagulant rodenticide exposure.[26]

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