

Supporting Wildlife Services

Predation Control with M-44s and Livestock Protection Collars

Sodium cyanide capsules, used in M-44 ejectors, and sodium fluoroacetate, commonly known as Compound 1080, used in Livestock Protection Collars (LPC,) are just two of many tools wildlife damage management tools used by the Wildlife Services (WS) program of the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS). Each of these control methods are used to protect livestock, poultry and threatened and endangered species from predation by coyotes, foxes and feral dogs.

The M-44 Sodium Cyanide Ejector Mechanism

Sodium cyanide in M-44s is an effective, environmentally sound tool registered by the Environmental Protection Agency (EPA) and used only by trained and certified applicators. There are 26 EPA-mandated use restrictions governing the use of M-44s. All M-44s used in WS field operations are well marked and are checked by trained personnel at least once a week.

M-44s are used primarily for coyote damage management. They are placed along game trails, livestock trails, ridges, near seldom-used ranch roads and along fence lines. The M-44 is used mostly in the winter and spring, but in some locations, it is used throughout the year.

In addition, the M-44 is registered for the control of communicable disease vectors, such as coyotes that carry rabies.

Damage

Coyotes, foxes and feral dogs cause substantial damage to livestock and poultry producers, particularly those with sheep and goats.

In 2004, the National Agricultural Statistics Service (NASS) surveyed sheep producers and found that more than one-third of U.S. sheep and lamb death losses were due to predator causes – predators killed 25.6 sheep and lambs every hour, resulting in a loss of 224,200 sheep and lambs. Coyotes were responsible for 51.7 of all sheep and lamb predator loss.

In addition, coyotes, foxes and feral dogs are a significant predator of cattle and calves and kill

thousands of chickens, turkeys, ducks, geese and other birds every year.

Mode of Operation

The M-44 works by ejecting sodium cyanide powder into the mouth of the predator. The ejection is triggered when the animal pulls on the baited M-44 unit. The sodium cyanide powder reacts with the moisture in the animal's mouth, releasing hydrogen cyanide gas. Death occurs from 10 seconds to 2 minutes after the device is triggered.

Environmentally Safe

The M-44 is safe to use and poses an insignificant risk to the environment. The amount of sodium cyanide mixture in each capsule is approximately 0.03 ounce (0.97 gram). If, for some reason, the contents of the capsule spill onto the soil, the active ingredient dissipates into gas rapidly due to soil moisture. If there is no moisture, the sodium cyanide filters through the soil, where it is readily degraded by micro-organisms or other mechanisms.

Experiments conducted by WS' National Wildlife Research Center designed to study the effects of cyanide contamination of the soil from application of M-44 cyanide capsules indicate that the toxic effects of cyanide are extremely short-lived because cyanide decomposes within 24 hours into harmless byproducts. Bioaccumulation is extremely unlikely because the material is metabolized immediately.

The risk of secondary poisoning of predators feeding on the carcass of an animal killed with an M-44 is nonexistent. The M-44's mode of action – chemical asphyxiation – limits the assimilation of the toxic compound into the body and tissue for availability to predators feeding on an animal killed by this device. In other words, an animal feeding on a predator killed by an M-44 will not be harmed because there is virtually no poison in the dead animal's tissues to pass along to the scavenging animal.

To protect the user against the unlikely event of exposure to the compound, amyl nitrite is available as an antidote. All applicators are required to carry an antidote kit when applying M-44s.



Predation Control with M-44s and Livestock Protection Collars

Non-target Hazards

To prevent adverse or harmful effects on the environment, including non-target animals, WS assesses the potential impact of its activities before using the M-44 or any other wildlife damage management tool.

In placing M-44s in the field, WS personnel use their expertise in animal behavior patterns to minimize the risk of attracting non-target animals to the device. Through the use of specialized lures and attractants designed for offending animals, the risk to non-target animals is highly minimized.

Livestock Protection Collars



A sheep wearing a LPC.

Coyotes are the leading cause of predation losses in the sheep and goat industry. The LPC is a wildlife damage management tool used by WS to protect sheep and goats in fenced pastures from depredating coyotes. The collar is the most selective method available to manage coyote predation on sheep and goats and can only be used by certified pesti-

cide applicators. The LPC is a very selective management tool because only the coyote attacking the sheep or goat is killed.

Compound 1080 in LPCs is registered by the EPA, and WS personnel who use it must be certified in its use through the state pesticide regulatory agency. Certified WS applicators must follow all label directions and use restrictions set forth by the EPA when using the LPC.

Mode of Operation

The LPC consists of two small rubber bladders containing 15 ml each of Compound 1080, placed under the throat of a sheep or goat, and held in place with Velcro straps. When a coyote attacks a collared animal and bites the throat where the LPC is positioned, the coyote receives a dose of Compound 1080 in the mouth.

Compound 1080 is a naturally occurring organic fluorine compound extracted from the West African plant “ratbane” (*Dichapetalum toxicarium*). WS currently uses less than four tablespoons of the compound nationwide each year. It works by blocking the krebs cycle, the major mechanism for releasing energy from food. Within five hours of receiving a dose in the mouth, the coyote will die a painless death from cardiac failure or central nervous system failure.

Environmentally Safe

Compound 1080 is a chemically stable, nonvolatile compound and is relatively insoluble in most organic solvents. Should it spill into the soil during a predator attack, the compound is degraded by soil microorganisms. Most soils contain a microbial population that is sufficiently varied and abundant to result in degradation of any Compound 1080. Accumulation of the toxicant in plants is limited, as plants produce enzymes capable of degrading it.

The toxic contents of LPCs are dyed yellow and easily detected when spilled. Affected soil can be scooped up with a shovel according to the directions on the pesticide label. However, should a spill go undetected, it will be degraded in the soil.

Non-target Hazards

WS employees use their expertise in animal behavior patterns and biology to determine the risk to non-target animals. When WS employees recommend using LPCs for a particular situation, the risk to non-target animals must be determined, as directed in the WS decision model.

Secondary poisonings do not occur because after coyotes ingest the Compound 1080 in the LPC, their carcasses contain only nontoxic, trace levels of it. In research conducted by WS, scavenger species were fed tissues from coyotes killed with Compound 1080 and showed no negative effect.

Livestock carcasses contaminated with the toxicant in its raw form on the wool or hair near punctured collars may pose a risk to scavengers. However, in research studies with dogs, skunks, magpies and eagles that were allowed to feed on contaminated carcasses, these species were not adversely affected because they would not eat the contaminated wool or hair.



American Sheep Industry Association Supporting Wildlife Services

www.sheepusa.org • info@sheepusa.org