

PROJECT REPORT

Project Title: Development of a DNA based procedure for efficient and selective removal of predatory coyotes using the coyote lure operative device

Research Agency: National Wildlife Research Center

Principal Investigator: J. Johnston

Budget: \$74,000

Background:

Northern California sheep losses due to coyote predation have increased significantly in the last several decades. Research at the University of California Hopland Research and Extension Center has shown that 90% of predation is due to alpha coyotes. Selective removal of alpha coyotes was the most effective means of controlling these losses. This was accomplished with Compound 1080 delivered via the Livestock Protection Collar. Compound 1080 is now banned in California. However, a joint NWRC/VPCRAC funded project is conducting research aimed at developing a more socially acceptable, selective, natural predator toxicant based on ingredients isolated from cocoa. This new toxicant could be delivered via the Livestock Protection Collar as well as other delivery systems such as the coyote lure operative device (CLOD). The CLOD is a device that could deliver a variety of compounds (toxicants, drugs, vaccines) to coyotes. However, to effectively use the CLOD to deliver toxicants, previous research and social pressures suggest that the CLOD must be able to selectively deliver its contents to predatory (alpha) coyotes. To maximize the effective use of the CLOD, procedures must be developed that will ensure that the same coyotes that are consuming the CLOD contents are also attacking sheep.

NWRC has developed a state-of-the-art DNA Wildlife Molecular Genetics Laboratory. This laboratory has developed a DNA fingerprinting technique that permits the identification of the individual coyote responsible for predation from the analysis of saliva swab collected from a sheep carcass. By applying this technique to the analysis of saliva collected from CLODs that have been bitten by coyotes, we will be able to determine the DNA fingerprint of each coyote that consumed the CLOD contents. By collecting coyote-chewed CLODs several times a week, we will be able to determine the DNA fingerprint of the coyotes that are preferentially visiting each CLOD. Analysis of saliva swabs collected from sheep carcasses will permit us to determine the DNA fingerprint of the coyotes responsible for predation. Comparison of the DNA fingerprints from the carcass and CLODs will permit us to determine whether the same coyote(s) are biting the CLOD(s) and attacking sheep. This information would permit California ranchers to fill the predator-preferred CLOD with a control agent such as the natural predator toxicant, thereby effectively removing predatory coyotes.

Objectives:

- 1) Apply saliva-based DNA fingerprinting technique to CLODs.
- 2) Apply saliva DNA fingerprinting technique to field study.
- 3) Determine the ability of the CLOD to selectively deliver control agents to predatory coyotes.

Progress to Date:

Objective 1: CLODs were offered to caged coyotes. Saliva was collected from the swabbed CLODs and analyzed by the NWRC molecular genetics laboratory. The analyses were 100% successful with respect to species identification and individual genotype (DNA fingerprint).

Objective 2: About 100 CLODs were placed in transects at the Hopland Research Center. CLODs were baited with Fatty Acid Scent, Government Call, Subdued or Powder River attractants. CLODs were checked at least weekly. Saliva samples collected from CLODs and predated sheep carcasses were stored and shipped in a frozen state to the NWRC laboratory. CLOD activation was greatest during the winter months January - March. The success rates of the Government Call and Fatty Acid Scent were the greatest, at 4.9% and 5.3%, respectively.

Objective 3: Unfortunately, none of the genotypes from coyote saliva collected from carcasses matched genotypes from CLOD-harvested saliva.

Overall, the DNA analyses:

- 1) Showed a high degree of success for species identification (76 - 100%).
- 2) Showed a moderate degree of success for individual identification (35 - 100%).
- 3) Should be able to identify predatory coyotes that activate CLODs
- 4) Showed no matches of CLOD saliva (30) and sheep carcass saliva (6).

Field work showed the CLOD was most successful during the critical period of pre-lambing/lambing.

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