

## PROJECT REPORT

**Project Title:** Development of diazacon for population control of American crows

**Research Agency:** National Wildlife Research Center

**Principal Investigator(s):** C. Yoder and L. Miller

**Budget:** \$175,000

**Background:** American crows roost communally. Communal roosts are most common during fall and winter months and may contain tens of thousands of birds. Prior to 1960, the scientific literature indicates these roosts were located in rural locations. However, starting the 1960s, there was a nationwide change in roosting habits with a shift from rural roosts to urban roosts. These urban roosts created many new problems for urban dwellers. Fecal droppings and regurgitated pellets foul and damage vehicles, buildings, walkways, yards, shrubs and other plantings beneath and near roosts and fueled public health concerns. The noise from crows calling as they leave a roost in the morning is an additional nuisance for residents.

Efforts to disperse crows from night roosts typically rely on pyrotechnics, shooting, or distress calls. These techniques can be successful for small to moderate-sized roosts, but are less successful for larger roosts encompassing larger areas. In addition, these existing techniques are not always appropriate or acceptable for urban settings. New strategies and techniques are needed to control or limit the number of crows at roosts.

Contraception may provide an alternative management technique. Diazacon is a cholesterol inhibitor that has shown promise as a contraceptive agent. It works by blocking the conversion of desmosterol to cholesterol. Cholesterol is needed for the production of steroid hormones such as testosterone, progesterone, and estradiol. Birds treated with diazacon show a decrease in cholesterol and an increase in desmosterol. A decrease in reproductive hormones results and egg laying and fertility are affected.

**Objectives:** This study will attempt to develop a compound, diazacon, for reproductive control of American crows. The study will be a laboratory and field study. The lab study precedes any field application.

The objectives of the lab study are:

- 1) To determine the effect of diazacon on cholesterol production by measuring non-esterified cholesterol and desmosterol levels
- 2) To determine the most effective dose of diazacon by testing 3-5 different dose levels and monitoring for signs of toxicity and other parameters
- 3) To determine length of efficacy of diazacon as a contraceptive by observing how long it takes for cholesterol production and possibly, reproductive hormone levels to return to normal.

**Summary:** This study attempted to develop a compound, diazacon, for reproductive control of

American crows. Diazacon inhibits cholesterol production by inhibiting a key enzyme in the conversion of desmosterol to cholesterol. Cholesterol is necessary for reproduction because it is needed for production of steroid reproductive hormones. Laboratory studies were conducted from January to March 2004 and May to August 2004 (gavage study and free-feeding studies). A preliminary field study was also conducted from February to March 2005 to assess the feasibility of various capture and marking techniques, DNA sexing, and monitoring daily crow movements in the Yuba City area of Sutter County. Additionally, a pelleted bait was tested to determine palatability.

In both lab studies, the gavage study and the free-feeding study, cholesterol concentrations were significantly lower in the treated groups of crows compared to the control (nontreated) groups. There was no significant effect of treatment on body weight and there was no mortality due to diazacon.

In the field study 100 alpha-chloralose bread baits were put out over a 3-week period. Twelve crows were captured, 3 of which died as a result of the alpha-chloralose, and 1 had to be euthanized. The remaining 8 crows were banded and tagged; 6 were fitted with radio transmitters, and all 8 were released. Results of DNA analysis were available within 24 hr. Seven crows were sexed using DNA analysis, 5 were female and 2 were male. Patagial tags and leg bands aided in the identification of 2 crows killed by predators. Radio transmitters allowed 6 crows to be located in the field.

Consumption of the pelleted bait varied significantly among sites, ranging from 0 to 158 gm. The bait was taken at 9 of 20 sites.

In conclusion: 1) the gavage study showed crows could potentially be adequately contracepted using diazacon. In the free-feeding study consumption of diazacon-treated eggs was 73% of the consumption of untreated eggs, resulting in a lower dose than what was targeted. This resulted in less of a decrease in cholesterol concentrations.

2) The use of alpha-chloralose to capture crows was inefficient and risky for the health of the crows. Cannon netting at night roosts was the most promising method tested.

3) The DNA sexing proved to be a useful and efficient technique. The results were quickly available, reliable, and accurate.

4) The use of radio transmitters to first locate crows, followed by identification of individual crows fitted with patagial tags proved to be a workable method of tracking daily crow movements.

5) Management implications: Diazacon has potential as a management tool in an integrated pest management program. Many of the issues associated with a field test of diazacon as a reproductive inhibitor for crows were addressed in the preliminary field trial. Prior to any full-scale study, a palatable bait must be identified. Use of food items already consumed by crows in the area are recommended as vehicles for diazacon. Bait should be coated at a target dose of 75 mg/kg. Crows should be captured at night roosts using cannon nets to maximize the number captured. Crows should be captured close to the breeding season, but when they are still in night roosts to minimize the number of migratory crows captured. Sexing of crows should be performed to allow researchers to mark primarily females to aid in locating individual nests. As a management tool for winter crow roosts, diazacon will not be efficacious if used alone in a small area. Diazacon should be used in conjunction with other management techniques. Because lethal control is contraindicated in the Yuba City area, diazacon would need to be applied on a large scale over the Sacramento Valley. Otherwise, a sink for breeding crows could be created, allowing non-breeding pairs to move into the area and begin breeding. Finally, it

should be noted that population reduction at winter crow roosts based solely on the use of diazacon would likely take several years to achieve.

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