

## DOES DRUGGING CROWS FOR CAPTURE CAUSE ABNORMALLY HIGH MORTALITY?

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**Abstract.**—A recent paper described a method of using drugged eggs to capture American Crows (*Corvus brachyrhynchos*), and reported that two or three of 15 crows died within 2 d of capture (Stouffer and Caccamise 1991a). Survival data from two on-going studies of American Crows in California and New York indicate that the loss of 13–20% of a sample within such a short period of time is abnormally high, and point to the possibility that the technique may be too risky to be used in some situations.

### ¿PUEDE EL USO DE DROGAS PARA CAPTURAR CUERVOS CAUSAR UNA ALTA MORTALIDAD?

**Sinopsis.**—En un trabajo reciente se describe un método en el cual se utilizan huevos cebados con drogas (alfa-cloralosa) para la captura de cuervos (*Corvus brachyrhynchos*). En el mismo se indica que de dos a tres de 15 individuos, murieron dentro del periodo de los próximos dos días posterior a su captura (Stouffer y Caccamise 1991a). Los datos de supervivencia de dos estudios que se están llevando a cabo con cuervos en California y New York tienden a indicar que la pérdida del 13–20% (en el trabajo antes citado) en un corto período de tiempo, es anormalmente alta. Es muy posible que la técnica sea de alto riesgo para ser utilizada en algunas situaciones.

Stouffer and Caccamise (1991a) recently described capturing free-flying American Crows (*Corvus brachyrhynchos*) in New Jersey using alpha-chloralose as a safe and effect method of capture, “. . . causing no apparent harm to the birds” (p. 450). Yet they stated that two of 15 crows died within 2 d of capture, and that a third disappeared. Although the number of animals in the study is small and prevents drawing firm conclusions, this percentage of mortality appears high. Comparable data do not exist in the literature on the survival of American Crows; therefore, we present here largely unpublished data on crow survivorship and mortality from our on-going studies that will put the loss of three crows into perspective and allow the assessment of risk for this technique.

Stouffer and Caccamise (1991a) found two crows dead within 2 d of capture, and another could not be located. The missing crow was subsequently found alive (Caccamise, pers. comm.), so the mortality in their study therefore was 13.3% of the sample within 2 d. The authors indicated that all 15 captured crows were older than 1.5 yr (Stouffer and Caccamise 1991a). In a population of Western American Crows (*C. b. hesperis*) in

Encino, California, annual mortality of marked, resident breeding adults over the course of 5 yr was 3% for females ( $n = 29$ ), and 7% for males ( $n = 64$ ) (Caffrey 1991). These percentages represent the actual mortality among females and the maximum possible among males (one male assumed dead was never found and may have left the area, although this possibility is unlikely). In the same study, for marked individuals alive as yearlings, mortality for those of known fate over the following 2 yr was 13% ( $n = 30$ ; Caffrey, unpubl. data). In a population of crows in central New York state, the maximum mortality of two cohorts of marked second year crows for the 6 mo from late fall to 2 yr of age (November–April; the same season crows were captured by Stouffer and Caccamise 1991a) was 8.9% ( $n = 56$ ; McGowan, unpubl. data). Maximum mortality of one cohort over their third winter was 15.8% ( $n = 19$ ; McGowan, unpubl. data). Even in the most vulnerable sample of crows where mortality should be greatest, namely hatch year/first year birds over their first winter, only 21.7% were dead or missing after 6 mo ( $n = 143$ ; McGowan, unpubl. data). The data from New York undoubtedly overestimate mortality, as some missing individuals probably dispersed. Taken together, the survival data from California and New York indicate that the death of 13% of a sample of crows within 2 d is abnormally high.

Stouffer and Caccamise (1991a) suggested that the handling of captured crows and attachment of radio transmitters, rather than the drugging itself, may have played a role in the deaths. Radio packages have been shown to influence behavior and decrease survival in some bird species (see Hooge 1991, and references therein). The authors, however, used radios of less than 3% body mass (Stouffer and Caccamise 1991b), well below the recommended maximum weight (Cochran 1980). Caccamise (pers. comm.) indicates that problems associated with radio attachment and the initial response of the birds to the package have led to increased mortality in birds he has tagged in the past. As individuals are distracted by their radio packages, especially in the first few days following capture, radio-tagging may cause increased mortality by interfering with normal activities associated with survival, such as scanning for predators (Caccamise, pers. comm.). Although handling is certainly a short-term trauma to birds, similar handling appeared to have no ill effects on 198 free-flying crows captured by Caffrey over seven years (unpubl. data). Many individuals were caught in various drop-in and walk-in traps, but the majority were caught using a cannon net (presumably stressful on a short-term basis); all had several morphological measurements taken and blood drawn, and were marked with patagial tags (details will be published elsewhere). As with radio-transmitter backpacks, crows may spend time manipulating and pulling at patagial tags and leg bands in the first few days after marking (pers. obs.). In California, no marked individuals were ever found dead within weeks of handling, although dead crows are found regularly in the study area. The shortest period between capture and known death for an individual was approximately 9 mo. Of the 198 individuals captured and marked, 116 were residents on Caffrey's urban

study site (including 17 that were captured more than once) and were observed regularly over several years. Of the 82 non-residents marked, 49 were observed later in other locations.

Both of the individuals that died were found partially eaten, and Stouffer and Caccamise (1991a) were unable to determine if the two recovered crows had been taken by predators or had died of other causes and the bodies been scavenged. In light of our data on crow survival, it seems feasible that the drugging itself contributed to the deaths reported by Stouffer and Caccamise. The crows may have died either as the direct result of the toxicity of the drug, or they may have been impaired such that they became easy prey for predators. Alpha-chloralose has been suggested to be only a marginally safe capture agent for some bird species, especially in applications involving wild species where the amount of the drug ingested by an individual bird is not controlled (Loibl et al. 1988). Stouffer and Caccamise (1991a) indicated problems in administering accurate dosages of the drug. As they could not control how much of the sedative was actually ingested, they used relatively high dosages in baits. The individuals that died may have ingested particularly high doses. It is also possible that the drug interacted with a pre-existing kidney problem, or that there was some hepatic recirculation of the anesthetic such that the crows became somewhat impaired again at a later time (G. Kollias, pers. comm.).

Stouffer and Caccamise (1991a) suggest several precautions for using their technique. We wish to comment on them, in order: (1) "Sedatives probably will not be effective except in the late fall and winter when bait acceptance is high." Whether or not crows can be trained to take bait appears to be a local phenomenon. Crows of all ages in Encino take bait all year long. Some breeding adults take bait readily during breeding season, when feeding requirements are high. Additionally, capturing crows during fall and winter increases the chance that non-residents will be involved; wasted effort for some studies. (2) "We suggest beginning with a low dose, and increasing it until the least effective dose is found. Our dose reflects the amount of egg the birds consumed, which might vary under different conditions." We agree with the first statement and stress the need for additional field and laboratory tests regarding effective doses for capture as well as short- and long-term consequences of ingestion. Regarding dosage delivery, chopped-up hard-boiled eggs might allow more accuracy. Caffrey (unpubl. obs.) found that chopping hard-boiled eggs into small pieces provided sustainable bait (no leaking into the substrate) that could not be carried off, thus requiring crows to stand in place for extended periods to feed. Treated eggs spaced so that individual crows access only one at a time may allow more precise control over dosages delivered. (3) "We do not recommend this technique in habitats without good visibility. Crows often fly away from the bait station before they become impaired. For this reason it is also important to know the group's territorial boundaries and typical perches." We agree again. The authors state that the sedative takes 10–30 min to start acting and

40–60 min for it to exert maximum effect. Crows can travel several kilometers in that amount of time. Territorial crows may be relatively sedentary, yet non-residents and non-breeders can be quite mobile (pers. obs.). Ensuring the safety of each bird seems difficult if not impossible in many situations. (4) “It may be helpful to hold birds in an undisturbed aviary for 2 d before they are released. . . . It is possible that even a short absence from the group may have deleterious social consequences, however.” We agree that holding birds in captivity is wise, especially in light of the reported mortality. Two days of separation at most times of the year should not affect social relationships. Caffrey has successfully removed, rehabilitated, and returned several injured individuals in her study population, including an adult breeding female to its core area (Caffrey 1992) after 11 wk of captivity. The female, her mate and resident yearling daughter (all marked), and several marked neighbors all resumed normal post-breeding season activities. In a similar instance, McGowan successfully returned a nearly nutritionally-independent fledgling to its family after 2 wk in captivity. It is possible, however, that during migratory periods, removing an individual from its group could have significant negative consequences.

Crow species are notoriously wary and difficult to capture; no easy method exists. What works in one location may not work in others, and may not even work in the same place twice (pers. obs.). We applaud experimenting with new ways of capturing wary species, and credit Stouffer and Caccamise with being extremely careful regarding the health and welfare of drugged individuals. Although not clear in the original paper, the deaths of drugged crows occurred while they were still developing their protocol (Caccamise, pers. comm.). Therefore lower rates of mortality should be encountered once safe dosage levels have been established and their precautions are followed. Yet because at this time the dosage of sedative administered cannot be controlled, short- and long-term physiological and behavioral effects of the drug on crows have not been examined, drugged individuals may become incapacitated in unsafe places, and because the reasons underlying the high mortality documented by Stouffer and Caccamise (1991a) remain unclear, we urge caution in using this technique. We hope that continued research in this area will help refine the methodology and make this technique a safe and effective means of capturing crows.

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