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Use of alpha-chloralose by the Wildlife Services program to capture nuisance birds

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Abstract In 1992, the United States Department of Agriculture's Wildlife Services (WS) program received approval from the United States Food and Drug Administration (FDA) to use alpha-chloralose (AC) to capture nuisance waterfowl (Anatidae), American coots (*Fulica americana*), and pigeons (*Columba livia*). We summarized use of AC by the WS program to capture nuisance birds during 1994-1995. WS biologists used AC to capture 3,767 birds during 124 operations in 19 states. Captured birds included wild mallards (*Anas platyrynchos,* 20%), domestic mallards (24%), muscovies (*Cairina moschata,* 5%), Canada geese (*Branta canadensis,* 10%), domestic geese (8%), coots (27%), pigeons (5%), and other (<1%). The proportion of birds present at a site that were captured was less for pigeons (6%) than for waterfowl and coots (≥68%). Overall mortality of target birds was 5%, ranging from 0.1% (n=1,014) for coots to 67% (n=3) for mute swans (*Cygnus olor*). In addition, 102 nontarget birds were captured, of which there was 12% mortality. States with the greatest number of AC operations were Tennessee (14%), Georgia (12%), and California, Nevada, and Oregon (10% each). Most nuisance situations were at parks (39%), followed by golf courses and resorts (19%), and residential areas (17%). Capture operations were most frequent during March–April (29%) and least frequent during October–January (19%). AC is an effective tool to remove nuisance ducks, geese, and coots from situations where other techniques are impractical. We recommend additional research to improve existing techniques and to expand use of AC to capture other nuisance species.

Key words alpha-chloralose, American coot, Anatidae, capture agent, *Columba livia, Fulica americana,* pigeon, waterfowl, wildlife damage management, Wildlife Services

Alpha-chloralose (AC) is a chloral derivative of glucose, which has been used as an anesthetic in laboratory animals since 1897 (Balis and Monroe 1964). AC has been used to capture numerous avian species, including Canada geese (*Branta canadensis,* Crider and McDaniel 1967), mourning doves (*Zenaida macroura,* Martin 1967), wild turkeys (*Meleagris gallopavo,* Williams 1966), marabou storks (*Leptotilos crumeniferus,* Pomeroy and Woodford 1976), and American crows (*Corvus brachyrybnchos,* Stouffer and Caccamise 1991). AC has also been used as an avicide and rodenticide (Lees 1972). However,AC was not registered for use as a capture agent or pesticide in the United States.

After conducting laboratory and field trials (Woronecki et al. 1990, 1992), the United States Department of Agriculture's Wildlife Services (WS) program received approval in 1992 from the United States Food and Drug Administration (FDA) to use AC in the United States to capture nuisance waterfowl, American coots (*Fulica americana*), and pigeons (*Columba livia*, Woronecki and Thomas

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1995). AC was made available to WS biologists during March 1993 (Woronecki and Dolbeer 1994). Presently, AC is available for use only by certified WS biologists or their designees.

To become certified to use AC, WS biologists or their designees must complete a 12-hr course and pass a written examination administered by an AC-certified instructor. The course provides information on laws and restrictions, calculating dosages, formulating bait, conduct of capture operations, maintenance of captured birds, and record keeping. Typically, a field demonstration is conducted to provide hands-on training.

Under current regulations, waterfowl and coots can be captured with AC-treated corn or bread baits; pigeons can be captured with treated corn only. Prebaiting is typically conducted prior to capture efforts. For capture operations, AC is put in suspension in corn oil and applied to whole-kernel corn or injected into bread baits. AC-treated corn is broadcast in the bait area established during prebaiting. In contrast, bread baits are generally hand-tossed to target individuals. Immobilized birds typically recover within 24 hours.

Woronecki and Dolbeer (1994) described AC use by the WS program from March to December 1993; our objectives were to characterize AC use by the WS program during 1994–1995 and, based on these findings, to identify areas requiring additional research.

Methods

We first summarized the number of WS biologists certified by category (Trainer–Applicator or Applicator) to use AC during 1994–1996. We then compiled and summarized field data sheets completed by WS biologists and submitted semi-annually during 1994–1995. Information collected included date, state, location or situation (e.g., park, golf course–resort), target species, bait used, number of individuals feeding, number of target and nontarget birds captured, and mortality of captured birds. We defined an operation as ≥1 capture attempt for the same species at the same location conducted within 1 week.

Results

During 1994–1995, 59 WS biologists in 26 states were trained and certified to use AC; 32 were certified as Trainer–Applicators and 27 as Applicators. At the end of 1996, 124 WS biologists from 40 states were certified to use AC.

WS biologists reported capturing 697 birds during 1993, the first year AC was available for use (Woronecki and Dolbeer 1994). In 1994–1995, WS biologists used AC to capture 3,767 birds during 124 operations (1,901 birds, 71 operations in 1994; 1,866 birds, 53 operations in 1995; Table 1). Thus, the total number of birds captured from March 1993 to December 1995 was 4,464. Captured birds

Table 1. Number of birds captured with alpha-chloralose in the United States by United States Department of Agriculture's Wildlife Services biologists, 1994–1995.

Species	Bait	Number of operations	Number of birds captured	% mortality
Mallard				
	Bread	34	584	3
	Corn	4	154	2
	Unk.	1	8	—
	Subtotal	39	746	3
Domestic mallard				
	Bread	52	739	6
	Corn	5	142	3
	Unk.	3	8	0
	Subtotal	57	889	5
Muscovy				
	Bread	11	200	17
	Unk.	1	5	0
	Subtotal	12	205	16
Other duck[a]		4	≥36	≤17
Canada goose				
	Bread	20	325	8
	Corn	1	7	0
	Unk.	1	39	0
	Subtotal	22	371	7
Domestic goose				
	Bread	24	221	6
	Corn	2	79	4
	Unk.	2	3	0
	Subtotal	26	303	5
Mute swan				
	Bread	1	3	67
American coot				
	Bread	1	58	2
	Corn	9	956	0
	Subtotal	10	1,014	0.1
Pigeon				
	Corn	11	200	8
All species		124[b]	3,767	3

[a] Includes unknown, black duck, wood duck, and blue-winged teal. The number of unknown ducks captured during 1 operation was not recorded.

[b] Column sum exceeds 124 as multiple species were captured during 47 operations.

included mallards (*Anas platyrhynchos*, 20%), domestic mallards (24%), muscovies (*Cairina moschata*, 5%), Canada geese (10%), domestic geese (8%), coots (27%), pigeons (5%), and other (<1%). Most (84%) waterfowl were captured with bread baits in contrast to 94% of coots being captured with corn baits.

At least 68% of waterfowl and coots that consumed AC-treated baits were captured. In contrast, about 3,100 pigeons were estimated to have fed on AC-treated baits, of which only 200 (6%) were captured.

Overall mortality of target birds was 5%, ranging from 0.1% (n=1,014) for coots to 67% (n=3) for mute swans. Mortality of waterfowl and coots was ≥1.5 times greater when bread baits were used compared to corn baits.

WS biologists captured 102 nontarget birds (<3% of total captures), of which 12% died. Nontargets included wild and domestic mallard, black duck (*Anas rubripes*), blue-winged teal (*A. discors*), wood duck (*Aix sponsa*), redhead (*Aythya americana*), domestic goose, coot, gull (*Larus* spp.), blackbird, house sparrow (*Passer domesticus*), magpie (*Pica* sp.), and American crow. States with the greatest number of AC operations included Tennessee (14%), Georgia (12%), and California, Nevada, and Oregon (10% each). No other state comprised >6% of the total operations. Most operations occurred at parks (39%), followed by golf courses and resorts (19%), residential areas (17%), and urban structures (primarily for pigeons, 7%). Additional operations were conducted at feedlots, prisons, a military base, and a racetrack to capture injured birds and to assist a state agency with monitoring wildlife diseases. Capture operations occurred throughout the year, with operations most frequent during March–April (29%) and least frequent during October–January (19%, Figure 1).

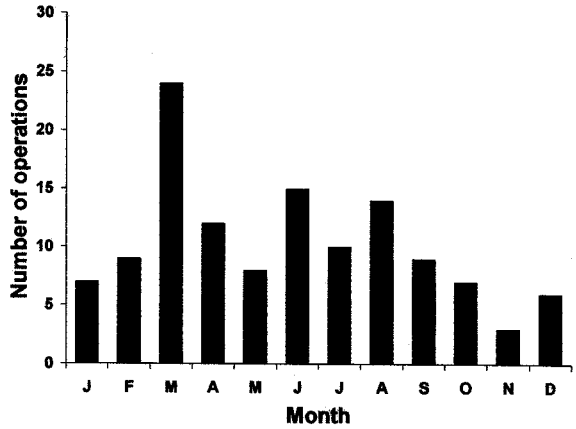


Figure 1. Number of operations, by month, in which alpha-chloralose was used to resolve nuisance bird problems in the United States by United States Department of Agriculture Wildlife Services biologists, 1994–1995.

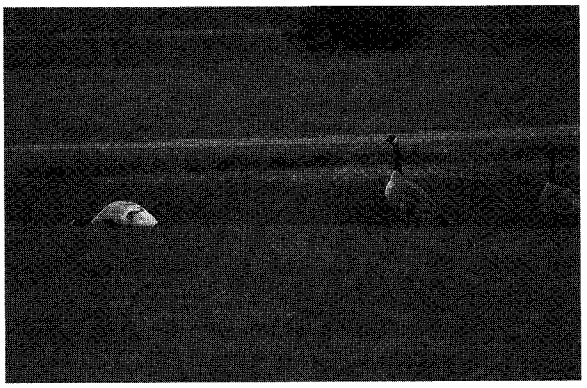
Discussion

AC was an effective tool to remove nuisance waterfowl from numerous situations where other techniques were determined to be less efficient or impractical. Mortality of target birds (5%) was half of the maximum mortality allowed by FDA for field operations. In addition, the number of nontarget birds captured was low (<3% of total). The reason mortality of nontarget birds (e.g., blackbirds, sparrows, magpies) was greater (12%) than target birds may be that nontarget birds received a greater AC dosage relative to body mass because of their smaller masses compared to target birds. Alternatively, differences in physiology among avian species could affect responses to AC, which may explain the greater mortality rate observed for swans.

Number of waterfowl present in urban areas (and the potential for conflict with humans) typically is greatest during spring and autumn (e.g., Conover and Chasko 1985). The great number of operations conducted during March–April likely reflects this relative increase in waterfowl use of urban areas. In contrast, the fewest operations were conducted during October–January. Because of potential secondary hazards to humans, FDA prohibited use of AC 30 days prior to and during legal hunting seasons for bird populations that could be harvested (Woronecki and Thomas 1995). As most birds captured with AC were wild waterfowl and coots, the low number of operations conducted during October–January is likely a consequence of this restriction.

The greater mortality rate for waterfowl and coots captured with AC-treated bread baits resulted partly because some birds received >1 bait. Individual AC-treated bread baits typically contain the estimated most effective dose (MED, 30 mg/kg for waterfowl and coots) for the target species (Woronecki et al. 1992). As the LD_{50} for Canada geese and mallards is 53.9 mg/kg and 54.6 mg/kg, respectively (Woronecki et al. 1992), waterfowl ingesting 2 bread baits would receive the LD_{50} dosage. In contrast, treated corn baits (about 1 mg AC/kernel) are broadcast over the bait area established during prebaiting, with number of kernels

Alpha-chloralose suspended in corn oil is injected into bread cubes to create baits with the optimum dose of AC to capture waterfowl. Photo by T. W. Seamans.



A 4-kg Canada goose that was immobilized 45 minutes after ingesting a bread bait containing 120 mg of alpha-chloralose (30mg/kg of body mass). Photo by United States Department of Agriculture.

broadcast based on the number of individuals present and their estimated mean body mass (Woronecki et al. 1992). Thus, it would be more difficult for a bird to ingest enough AC-treated corn to cause mortality. Birds that appear to be eating excessive amounts of treated corn also can be chased from the bait site.

That 2 of 3 mute swans died suggests that the prescribed MED of 30 mg/kg AC is too great for this species. Limited field trials with swans suggest a dosage of 10–15 mg/kg for adequate immobilization without mortality (Belant, unpublished data). Additional research with swans using known dosages of AC is required to better define the MED.

The number of pigeons captured in relation to the number feeding was about 11 times less than number of waterfowl captured. The crop of pigeons is used primarily for storage of food and allows for relatively constant amounts of food to be digested over time (Zeigler 1976). Thus, AC-treated corn consumed would be stored initially in the crop and assimilated over a longer period of time. We believe the low capture rate for pigeons was partly the result of a low assimilation rate of AC (Belant and Seamans 1999).

Research has continued in efforts to improve use of AC by the WS program. For example, additional formulations have been evaluated (e.g., AC tablets) that will simplify operations using bread baits for waterfowl and coots (Belant and Seamans 1997). Also, studies evaluating the effectiveness of AC to capture other species (e.g., gulls [Belant, unpublished, data]) have been conducted or are planned.

Alpha-chloralose is a humane, safe, and effective nonlethal technique to capture waterfowl and coots in various nuisance situations. AC has been well accepted by the general public for use in nuisance situations because birds are not harassed and

Mallards at a hotel in Phoenix, Arizona, being individually fed alpha-chloralose-treated bread baits. The ducks were immobilized, held for 24 hours, and released at a wildlife refuge. Photo by P. P. Woronecki.

do not exhibit painful symptoms (Woronecki et al. 1990). We recommend continued tabulation of operational AC use and additional research to improve existing techniques so as to provide AC as an additional tool for other nuisance species (e.g., gulls, blackbirds, house sparrows).

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