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EFFECTS OF DECOY GENDER AND WING CLIPPING ON CAPTURE SUCCESS OF BROWN-HEADED COWBIRDS.

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Abstract: Due to the risks that nest parasitism by brown-headed cowbirds (*Molothrus ater*) pose to breeding Kirtland's Warblers (*Dendroica kirtlandii*) and other songbirds, refinement of existing cowbird trapping techniques and development of new techniques are needed to improve the efficiency of cowbird removal. We conducted experiments during 1999-2002 to determine if the use of male and female decoys affected capture rates of cowbirds, and to determine if clipping primaries on one wing of female decoys to prevent escapes affected cowbird capture success. These experiments were conducted using 6 permanently placed modified Australian crow traps (decoy traps) measuring 3.6 x 3.6 x 2 m in Erie County, Ohio. Cowbirds were lured to the traps using a white millet/sunflower seed bait mixture and captive cowbirds used as decoys. To answer each question, we compared the number of male and female cowbirds captured for each trapping period among treatments at each trap using Analysis of Variance in a repeated measures design. We found no statistical effects of decoy gender or wing clipping on capture success for brown headed cowbirds. We proposed future research on trapping techniques to benefit endangered species management, management of blackbird damage in agricultural and airport situations.

Key words: Australian crow trap, bird trapping, brown-headed cowbird, decoy, *Molothrus ater*, wing clipping

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INTRODUCTION

Brown-headed cowbirds (*Molothrus ater*) are a species of blackbird native to the great plains region of North America. Cowbirds have expanded their range into previously unoccupied areas especially in the eastern United States in response to forest fragmentation (Jaramillo and Burke 1999). Cowbirds are nest parasites which lay their eggs in the nests of other birds and allow the host species to incubate and rear their young. In fact, cowbirds are known to have parasitized 220 different species, with 144 species successfully fledging cowbird young (Jaramillo and Burke 1999). Female cowbirds often chip or eject the eggs of the host species (Earley 1991), and young cowbirds may eject the young of the host species that share the nest (Dearborn 1996). In addition to these direct effects on the reproductive output of the host species, indirect effects of feeding parasitic young such as increased provisioning rates, lowered survival of host young (Dearborn et al. 1998, Payne and Payne 1998), and fewer nesting attempts (Mayfield 1977) also

contribute to decreased survival and reproduction of host parents. Cowbird parasitism may have an especially significant impact on endangered songbirds nesting in areas where cowbirds were not historically present. Kirtland's warbler (*Dendroica kirtlandii*), an endangered species that inhabits the pine forests of central Michigan, faced a breeding population decline from 500 to 200 pairs, 1961-1971, in part due to cowbird parasitism (Mayfield 1977, 1978). Subsequent cowbird control programs reduced nest parasitism from 59 % to 6 % of Kirtland's warbler nests during the first three years of the program (Shake and Mattson 1975), and parasitism rates averaged 3.4 % for the first 10 years of the control program. Since 1972, the U.S. Fish and Wildlife Service has removed over 116,000 cowbirds from Kirtland's warbler nesting areas (Louisas et al. 1999). Deloria et al. (1999) found that these removals had no effect on regional cowbird populations and concluded that continued existence of Kirtland's warbler would be impossible without annual cowbird control.

The primary method of cowbird removal has been trapping through the use of decoy traps (Shake and Mattson 1975, Lousias et al. 1999). This combination of bait and social facilitation using conspecifics can be effective for removing large numbers of cowbirds (Dolbeer 1994). Because cowbirds may travel 7 to 11 km between feeding and breeding sites (Rothstein et al. 1987, Curson et al. 2000), effective use of these food-based trapping approaches can remove cowbirds from breeding habitats within relatively large areas. Unfortunately, the captive cowbirds that are a primary attractant to free-ranging cowbirds to the decoy traps introduce the threat of escape of reproductively viable female cowbird decoys in the Kirtland warbler breeding areas (Deloria et al. 1999).

Due to the risks that nest parasitism by brown-headed cowbirds pose to breeding Kirtland's warblers and other songbirds, refinement of existing cowbird trapping techniques and development of new techniques is needed to maximize the efficiency of cowbird removal while preventing the accidental release of captive brown-headed cowbirds in core Kirtland warbler breeding areas. Improved trapping techniques might also prove useful in controlling cowbirds and other blackbirds in agricultural situations such as feedlots (Dolbeer 1994) or at airports (Barras et al. 2003).

Our objectives were to determine if decoy cowbird females can be excluded from live traps without reductions in trapping effectiveness and to determine if restricting the movement of female decoys by clipping wings to prevent escapes will affect cowbird capture rate.

METHODS

This study was conducted at the National Aeronautics and Space Administration Plum Brook Station (PBS), Erie County, Ohio. PBS is a 2,200-ha fenced facility with large tracts of open, fallow fields, interspersed with woodlots, and surrounded by agricultural fields. The station is home to a resident population of brown-headed cowbirds and staging area for migrating cowbirds. Decoy trap experiments were conducted using 6 permanently placed modified Australian crow traps (decoy traps) measuring 3.6 x 3.6 x 2 m (Dolbeer 1994).

The free-ranging brown-headed cowbirds found at the test site are the same species parasitizing the nests of the endangered Kirtland's warbler in central Michigan. It is critical to determine variations in trapping techniques that are most effective at reducing the nest parasitism problem. However, the

Kirtland's warbler is an extremely sensitive species, and any new trapping methods designed for use in their nesting habitats should be tested in areas where the method's potential ineffectiveness or unknown impacts to non-target species will not negatively impact Kirtland's warbler nesting efforts. There are no Kirtland's warblers at PBS, and the cowbirds captured at PBS are the exact individuals transported and used as decoys in traps on Kirtland's warbler breeding areas in Michigan.

Cowbirds were lured to the traps using a white millet/sunflower seed bait mixture with captive cowbirds as decoys. Groups of 10 decoy birds were individually marked with colored leg bands to help differentiate between decoy birds and newly trapped individuals. Decoy birds were fed (a mixture of millet and sunflower seeds and supplemented with commercial turkey ration) and given fresh water daily.

We conducted experiments during spring 1999-2001 (1999: 31 May – 24 June; 2000: 1 – 26 May; 2001: 2 – 11 May) to determine if the gender of decoy birds used in cowbird traps affected trap rate. We assigned the following treatments to each of 4 decoy traps in 1999 and 2000 in random order: 5 male and 5 female decoy birds + food bait, 10 male decoy birds + food bait, 10 female decoy birds + food bait, and food bait only. In 2001, we assigned the following treatments to each of 6 decoy traps in random order: 5 male and 5 female decoy birds + food bait, 10 male decoy birds + food bait. These treatments were applied to each trap for 4 consecutive days. We compared the number of cowbirds captured for each 4-day period among treatments at each trap to evaluate the null hypothesis.

To determine if clipping primaries on one wing of female decoys affected cowbird capture rates, we assigned the following treatments to each of 6 decoy traps in random order during 2001-2002 (2001: 15 – 25 May; 2002: 15 - 26 April): 5 unclipped male and 5 clipped female decoy birds + food bait, 5 unclipped male and 5 unclipped female decoy birds + food bait. These treatments were applied to each trap for 4 consecutive days. We compared the number of male and female cowbirds captured for each 4-day period among treatments at each trap to evaluate the null hypothesis.

We used a repeated measures design, applying experimental treatments in random sequence to each replicate trap. Analysis of variance and paired t-tests were used to test for differences between experimental treatments. Non-normal data were transformed using a ladder of powers transformation beginning with square root. Analyses were conducted using SAS statistical software and differences were deemed significant at alpha = 0.05.

RESULTS

Gender Experiments

During 1999, the number of cowbirds captured in traps did not differ among treatments ($F = 2.20$, $df = 3, 15$, $P = 0.158$). Mean capture rate was generally higher in treatments that contained females (control = 2.25 birds/4-day session, females = 5.25 birds/session, mixture = 5.00 birds/session, males = 1.75 birds/session). The number of cowbirds captured by treatment type is presented in Table 1. Likewise, the number of cowbirds captured in traps did not differ among treatments in 2000 ($F = 1.42$, $df = 3, 15$, $P = 0.301$; (control = 8.75 birds/4-day session, females = 17.00 birds/session, mixture = 15.00 birds/session, males = 8.75 birds/session). However, more birds were captured in traps that included females during 2001 ($t = -3.61$, $df = 5$, $P = 0.016$; mixture = 13.67 birds/session, males = 9.33 birds/session; Table 1).

Table 1. Number of brown-headed cowbirds captured by treatment in decoy traps baited with grain bait and male and female decoy cowbirds, May – June, 1999-2001, Erie County, Ohio.

		Males[1]	Females[2]	Mix[3]	Control[4]
1999					
	Males	0	19	16	7
	Females	7	2	4	2
	Total	7	21	20	9
2000					
	Males	28	49	45	28
	Females	7	19	15	7
	Total	35	68	60	35
2001					
	Males	55	N/A	73	N/A
	Females	1	N/A	9	N/A
	Total	56	N/A	82	N/A

[1] **Males = 10 male decoy birds + food bait.**
[2] **Females = 10 female decoy birds + food bait.**
[3] **Mix = 5 male and 5 female decoy birds + food bait.**
[4] **Control = food bait only.**

Wing Clipping

The number of cowbirds (mean = 2.41/day) captured in traps with decoy female cowbirds with clipped remiges during 2001 was nearly identical to that of traps with unclipped birds (mean = 2.39/day; $F < 0.01$, df = 1, 46, $P = 0.994$). The number of cowbirds captured in traps with female cowbirds with clipped remiges during 2002 (mean = 13.21/day) was numerically lower than that of traps with unclipped birds (mean = 17.96; $F = 1.12$, df = 1, 47, $P = 0.296$), although the differences were not statistically significant. The number of cowbirds captured by treatment type is presented in Table 2.

Table 2. Number of brown-headed cowbirds captured in decoy traps baited with grain bait, decoy male cowbirds, and wing-clipped and unclipped female decoy cowbirds, 2001 – 2002, Erie County, Ohio.

		Clipped[1]	Unclipped[2]
2001			
	Males	53	44
	Females	5	11
	Total	58	55
2002			
	Males	172	225
	Females	145	206
	Total	317	431

[1] **Clipped = 5 male and 5 wing-clipped female decoy birds + food bait.**
[2] **Unclipped = 5 male and 5 intact female decoy birds + food bait.**

DISCUSSION

In tests where gender of decoy birds was varied, trends in cowbird capture yielded significant statistical results only in 2001. Captures were low overall but were generally greater in treatments that included female decoy birds, especially captures of males. The lack of statistical differences may have been due to low sample size and poor statistical power, which was improved in 2001 when treatment levels were reduced and replicates increased. Wild populations of cowbirds are typically skewed toward males (Darley 1971, Ankney and Scott 1982), which may explain the preponderance of males in the traps. Although female cowbirds are more likely to re-enter decoy traps than males (Burtt and Giltz 1976), birds were not released and given that opportunity in this experiment. Thus, the low numbers of females trapped may be related to the timing of the tests (late spring – early summer), when only the territorial breeding females were available to be trapped.

In tests where wing clipping was applied to female decoy birds, none of the trends in cowbird capture yielded significant statistical results. During 2001, there were no discernable trends in number of birds captured among treatments. The experiment was conducted in late spring (15 – 25 May) and the overall number captured was very low. These data may indicate that captured birds were likely from the local breeding population and few were available for capture. Female cowbirds are territorial in their breeding habitats, especially in their core breeding areas (Dufty 1982, Darley 1983, Teather and Robertson 1985), and they would likely be familiar with the trap locations. In 2002, more birds were captured (748 versus 113 in 2001) and there was a trend toward greater number captured in cages with unclipped decoys. Experiments were conducted earlier in 2002 than in 2001 (15-26 April), which suggests that the greater numbers of birds captured may be due to the presence of spring migrants. These migratory cowbirds would likely be attracted to a readily available food source (i.e., bait) and the breeding displays and calls of the decoy birds, leaving them extremely susceptible to trapping efforts.

RESEARCH IMPLICATIONS

Because of the variability of site-specific capture rates, statistical differences are difficult to detect without large sample size. We recommend further evaluation of these questions using an operational system where sufficient numbers of traps can be included in the study. In order to reduce the threat of reproductively active female cowbirds from being introduced to an endangered species nesting area, we suggest that use of sterile female cowbirds as decoys be investigated. We further recommend development of techniques using recorded cowbird calls to attract female cowbirds to this and other types of traps. This technique has already been used effectively to attract cowbirds within range of shooters (Shake and Mattson 1975, Stutchbury 1997). Using calls to attract breeding cowbirds for removal seems especially promising, given that males may also be attracted to calls (Dufty and Pugh 1994) and females are slow to habituate to calls (Rothstein et al. 1987). In addition to endangered species applications, such improvements in trapping techniques may prove useful for removing cowbirds and other blackbirds from agricultural and airport settings where these species conflict with human activities.

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