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BROWN-HEADED COWBIRD PARASITISM OF WOOD THRUSH NESTS IN EASTERN TEXAS

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Abstract.—I measured and compared the frequency of nest parasitism by Brown-headed Cowbirds (*Molothrus ater*) on the Wood Thrush (*Hylocichla mustelina*) in eastern Texas to frequencies in other regions. I developed linear regression models based on parasitism data collected from other regions of the breeding range of the Wood Thrush and used these to predict parasitism frequencies in eastern Texas. Cowbirds parasitized two (3.9%) of 51 nests located in eastern Texas during 1993 and 1994, much lower than frequencies predicted by the regression models. The scarcity of feeding areas in the study area may have limited the size of the local cowbird population and reduced the frequency of parasitism.

PARASITISMO DE NIDOS DE *HYLOCHICHLA MUSTELINA* POR PARTE DE *MOLOTHRUS ATER* EN EL ESTE DE TEXAS

Sinopsis.—Medí y comparé la frecuencia de parasitismo de nidos del zorzal *Hylochichla mustelina* por parte del tordo pardo (*Molothrus ater*) en el este de Texas, con la frecuencia de parasitismo en otras localidades. Basado en datos de parasitismo tomados en otras localidades, desarrollé modelos de regresión linear para predecir la frecuencia de parasitismo en la localidad de estudio en Texas. Un parasitismo de 3.9% (dos de 51 nidos) de los nidos de zorzal estudiados en el 1993 y 1994, resultó menor a la frecuencia predicha por los modelos de regresión. El bajo número de áreas de alimentación para el tordo en las áreas de estudio muy bien pudieran limitar el tamaño de la población local de estas aves y por ende reducir la frecuencia de parasitismo.

The impact of nest parasitism by Brown-headed Cowbirds (*Molothrus ater*) on Neotropical migrant forest species has been studied extensively (Robinson et al. 1993). However, relatively little information is available on regional differences in parasitism frequencies. Parasitism frequencies of Wood Thrush (*Hylocichla mustelina*) nests vary considerably across the species range, with some regions experiencing frequencies as high as 100% (Brittingham and Temple 1983, Robinson 1992, Hoover and Brittingham 1993, Robinson et al. 1995). However, information on parasitism is lacking for some parts of the breeding range of the Wood Thrush, particularly the southwestern portion. During a study of habitat selection and breeding biology of the Wood Thrush in eastern Texas, I monitored the frequency of cowbird parasitism. The purpose of this paper is to compare parasitism frequencies observed in this study to those in other regions and discuss factors that may influence parasitism in this area and other portions of eastern Texas.

STUDY AREA AND METHODS

I searched for Wood Thrush nests from 1 May–31 Jul. 1993 and 1994 on the San Jacinto Ranger District, Sam Houston National Forest, San

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Jacinto County, Texas (95° 07′ W, 30° 30′ N). I checked nest contents every 3–4 d using a mirror mounted on a pole. I did not approach nests when cowbirds were observed nearby to minimize the likelihood of artificially increasing the frequency of parasitism. I surveyed four watersheds: Big Creek, Little Creek, and two major tributaries of the east fork of the San Jacinto River. These areas are managed for timber production, recreation, wildlife, and some oil extraction. Timber is managed primarily in even-age stands ranging from 4–40 ha on 100-yr rotations. Harvest methods include thinning, clearcuts, seed-tree cuts, and shelterwood cuts. Prescribed burns are common.

Hoover and Brittingham (1993) examined parasitism frequencies of Wood Thrushes by state in relation to the average numbers of cowbirds and Wood Thrushes detected on Breeding Bird Survey (BBS) routes between 1966 and 1989. However, they were unable to include Texas in their analysis due to the small sample of Wood Thrush nests found in the state. I developed two linear regression models to predict parasitism frequencies in eastern Texas based on parasitism data collected by Hoover and Brittingham (1993). For states other than Texas, I used the relative abundances of Wood Thrushes and cowbirds calculated by Hoover and Brittingham (1993) as independent variables in the models. As the dependent variable, I used the percentage of nests parasitized in each state as calculated from Wood Thrush nest records obtained by Hoover and Brittingham (1993) from the Cornell Laboratory of Ornithology Nest Record Program. I used BBS data to calculate the average number of cowbirds and Wood Thrushes per route in eastern Texas (physiographic boundaries based on Nixon 1985) between 1966 and 1989. I used the regression models to predict parasitism frequencies in eastern Texas using cowbird and Wood Thrush abundance estimates from eastern Texas.

RESULTS

Cowbirds parasitized two of 51 nests (3.9%) located during 1993 and 1994. During 1993, one of 37 active nests (2.7%) was parasitized with a single cowbird egg. The cowbird egg failed to hatch and the nest eventually fledged three thrushes. The cowbird egg eventually disappeared from the nest after three of the four thrush eggs hatched. During 1994, one of 14 (7.1%) nests was parasitized, again with a single cowbird egg. The nest eventually produced a cowbird and one thrush, although two thrush eggs and two thrush nestlings were observed during the nesting cycle.

Twelve BBS routes were completed at least 10 times each between 1966 and 1989 in eastern Texas. The average number of cowbirds and Wood Thrushes per BBS route in eastern Texas between 1966 and 1989 was 21.47 (SD = 9.33) and 2.66 (SD = 3.45), respectively. Data from Hoover and Brittingham (1993) indicated that the percentage of Wood Thrush nests parasitized per state was positively correlated with the average relative abundance of cowbirds and negatively correlated with the average

TABLE 1. Percentage of nests predicted to be parasitized in eastern Texas based on linear regression models developed from regional nest parasitism data collected by Hoover and Brittingham (1993). Shown for each model is the independent variable, R^2, y-intercept (β_0), regression coefficient (β_1), and predicted frequency of parasitism (%) (±95% confidence interval) for eastern Texas.

Independent variable	R^2	P	β_0	β_1	Predicted frequency of parasitism
WOTH[a]	0.49	0.001	49.85	−1.97	44.61 (±8.38)
BHCO[b]	0.41	0.002	3.51	2.33	53.54 (±13.27)

[a] Wood Thrush relative abundance estimates from BBS data for states other than Texas.
[b] Brown-headed Cowbird relative abundance estimates from BBS data for states other than Texas.

relative abundance of Wood Thrushes (Table 1). Both models predicted parasitism frequencies higher than that observed in this study (Table 1).

DISCUSSION

Wood Thrush nests in eastern Texas were parasitized less frequently than in other parts of the species breeding range. The predicted frequency of parasitism and the lower limits of the confidence intervals for both estimates were all substantially higher than the frequency I observed. The large numbers of cowbirds and small numbers of Wood Thrushes reported on BBS routes in eastern Texas suggests parasitism frequencies should be higher given the frequencies from other regions of the breeding range of the Wood Thrush. Parasitism frequencies have been reported as high as 100% (19/19) in Illinois and 80.0% (12/15) in Wisconsin (Brittingham and Temple 1983, Robinson 1992).

Landscape composition and habitat suitability may influence cowbird populations in a region (Rothstein et al. 1984, Thompson 1994, Robinson et al. 1995). Cowbirds are most abundant and the frequency of parasitism highest in a heterogenous landscape where nest-searching and feeding sites are intermixed and in close proximity to each other (Rothstein et al. 1984, Thompson 1994). In contrast, cowbird parasitism is negatively correlated with the percent of the landscape that is in forest cover (Robinson et al. 1995). Although my study area contained plantations, clearcuts, and some roads, these habitats probably do not provide optimal feeding areas for cowbirds. Areas with short grass, recently tilled croplands, and feedlots that are frequently used for feeding (Rothstein et al. 1984, Thompson 1994) were rare near my study area. Although no quantitative data are available on cowbird numbers in my study area, I detected few cowbirds during nest searches and nest observations. The scarcity of feeding areas and extensive forest cover in my study area may have limited the size of the local cowbird population and reduced the frequency of parasitism.

Two studies of Northern Cardinal (*Cardinalis cardinalis*) breeding bi-

ology in eastern Texas found patterns of nest parasitism similar to that in this study. None of the 13 nests found by Booth (1980) in a large, unfragmented pine-hardwood forest had been parasitized. In contrast, Conner et al. (1986) found 7 of 21 cardinal nests had been parasitized in a pine-hardwood forest adjacent to agricultural lands. Conner (pers. comm.) attributed the difference in parasitism frequencies between the two study areas to the availability of agricultural lands near the second study area. The availability of feeding areas for cowbirds near this forest may have increased their numbers and resulted in the higher parasitism frequencies observed.

The low frequency of parasitism observed during this study does not suggest that parasitism may not occur more frequently in other parts of eastern Texas. The frequency of parasitism can vary across a region. In a single county in Pennsylvania, approximately 9% of 171 Wood Thrush nests were parasitized (Hoover et al. 1995). In contrast, the frequency of parastism was 21% for 105 Wood Thrush nests recorded prior to 1990 from throughout Pennsylvania (Hoover and Brittingham 1993). Results obtained by Conner et al. (1986) suggest parasitism may be more severe in other parts of eastern Texas than in my study area. My study area was small and represented a densely forested portion of eastern Texas. A larger sample of nests distributed throughout eastern Texas would provide a better regional estimate of parasitism and its potential impact on the Wood Thrush. The high parasitism frequencies predicted by BBS data from eastern Texas is probably a result of BBS data being collected from several sites in different habitats along routes that would include both suitable (agricultural lands) and unsuitable (forest) cowbird feeding habitat. Although BBS data indicate portions of this region support large numbers of cowbirds, densely forested portions that are managed and cut, but remain forest habitat, may be better insulated from parastism. The U.S. Forest Service in eastern Texas manages forests on 100-yr rotations, producing very little foraging habitat for cowbirds in large, unfragmented forests, even assuming recent clearcuts may be suitable. Large forested tracts, such as those managed by the U. S. Forest Service, may be important refuges against parasitism for nesting songbirds.

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