BULLETIN OF THE

TEXAS ORNITHOLOGICAL SOCIETY

Vol. 33 March, 2000 No. 1

THE FLIGHT SONG DISPLAY OF THE CASSIN'S SPARROW (*AIMOPHILA CASSINII*): FORM AND POSSIBLE FUNCTION

James T. Anderson[1] and Warren C. Conway

Department of Range, Wildlife, and Fisheries Management, Texas Tech University, Lubbock, Texas 79409-2125

Abstract.—We studied the flight song display behavior of male Cassin's Sparrows (*Aimophila cassinii*) during the early breeding season. Data were collected on randomly selected male Cassin's Sparrows occurring in a mixed honey mesquite (*Prosopis glandulosa*)-grassland in the Southern High Plains of West Texas. Cassin's Sparrows performed 100% of perched songs and initiated 97.8% of the flight song displays from the upper parts of mesquite trees. When performing flight song displays Cassin's Sparrows flew an average distance of 8.1 m at an average height of 3.6 m, and rotated an average of 96° from take-off to landing. Males were more likely to perform flight song displays than perched songs when in the presence of other birds ($P < 0.05$), although there were no differences ($P > 0.05$) in measured variables of flight song displays between displays apparently caused by other birds and those initiated without an apparent stimulus. We hypothesize that the flight song display of the Cassin's Sparrow has multiple functions, including mate attraction, territorial defense, and predator detection/avoidance.

Singing by male passerine birds during the breeding season is a well studied behavior (Wiley 1991, Catchpole and Slater 1995). However, song is not the only form of sexual or territorial advertisement used by male passerines. Some species, such as Bobolinks (*Dolichonyx oryzivorus*), Common Yellowthroats (*Geothlypis trichas*), Five-striped Sparrows (*Amphispiza quinquestriata*), Seaside Sparrows (*Ammodramus maritimus*), Ovenbirds (*Seiurus aurocapillus*), Swamp Sparrows (*Melospiza georgiana*), and Vesper Sparrows (*Pooecetes gramineus*) perform flight song displays, but deliver their primary song from perches (perched song) within their territory and perform visual displays only secondarily (Post and Greenlaw 1975, Lein 1981, Groschupf and Mills 1982, Capp and Searcy 1991, Nowicki et al. 1991, Ritchison 1991, Wells and Vickery 1994).

Detailed studies of flight song displays in passerines are few, but Lark Buntings (*Calamospiza melanocorys*) and Cassin's Sparrows (*Aimophila cassinii*) deliver their primary songs during flight (Rising and Beadle 1996). Cassin's Sparrows are a little known, secretive species that breeds in mixed shrub-grasslands throughout the southwestern United States to Nebraska and central Texas (Rising and Beadle 1996). Its flight song display is very conspicuous and may be used by biologists to indicate breeding activities in an area (Borror 1971, Schnase 1984, Schnase et al. 1991, Bock and Scharf 1994). Borror (1971) reported that when performing flight song displays, male Cassin's Sparrows sing while flying upward from a low perch at an angle of about 30° and fly to the ground

---

[1] *Current Address: West Virginia University, Division of Forestry, Wildlife and Fisheries Resources Program. P. O. Box 6125, Morgantown, WV 26506-6125. E-mail: Wetland@wvu.edu*

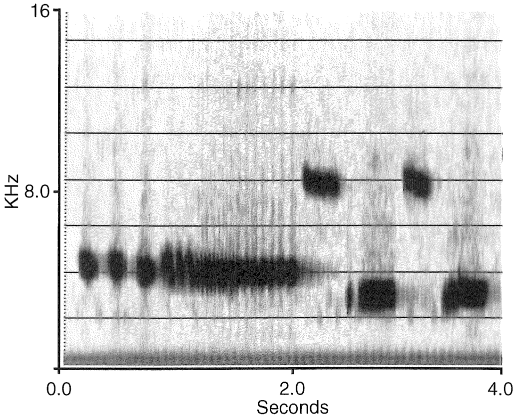

Fig. 1. Typical song of Cassin's Sparrow (*Aimophila cassinii*). Prepared by the staff of the Center for Bioacoustics, Texas A&M University-Corpus Christi using a Kay Elemetric DSP 5500 Sona-Graph.

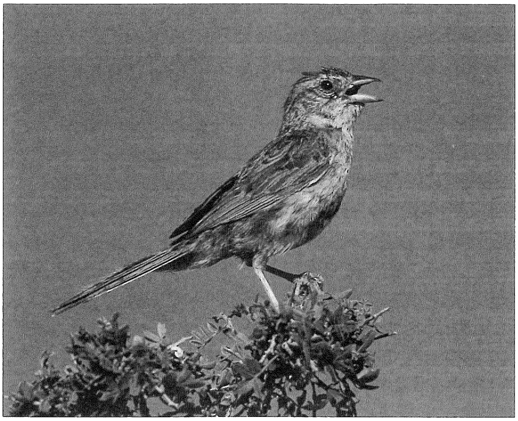

Fig. 2. Cassin's Sparrow (*Aimophila cassinii*). Photo by Brian E. Small/VIREO.

or a low perch near the end of the display. Further quantification of this display may give insight into the potential function(s) of this unique behavior (Catchpole and Slater 1995).

Hypotheses have been proposed to explain the evolution and function(s) of flight song displays in general, but because displays are given infrequently (Wells and Vickery 1994), most hypotheses have not been tested. The Cassin's Sparrow flight song display may only have mate attraction functions (Johnson 1956, Schnase et al. 1991, Bock and Scharf 1994), whereas perched songs may be used for territorial defense (Schnase et al. 1991). Because Cassin's Sparrows are not sexually dimorphic (Rising and Beadle 1996), it is difficult to completely support either one of these hypotheses without the aid of color banding. However, hypotheses evaluating how territorial male Cassin's Sparrows respond to conspecifics and other species may be evaluated.

In the present study, we quantified several features of the Cassin's Sparrow's flight song display. Secondarily, we evaluated hypotheses concerning the possible functions of this display.

STUDY AREA AND METHODS

We collected data on displaying male Cassin's Sparrows, 2–4 days weekly from the time of arrival (24 March 1996) until the population stabilized (19 May 1996) (unpublished data) in Lubbock, Texas, at the Texas Tech University, Department of Range, Wildlife, and Fisheries Management's range barn site. The study site is a 1 × 2 km mixed honey mesquite (*Prosopis glandulosa*)-grassland (mainly *Bouteloua* and *Panicum* spp.) located within Lubbock city limits.

We located and collected data on displaying male Cassin's Sparrows by hearing singing or observing flight song displays. Once a displaying male was located, we remained 10–20 m away. Each focal bird was classified as delivering a perched song or a flight song display. Non-displaying Cassin's Sparrows were not selected as focal individuals, because males and females cannot be accurately sexed under field conditions (Rising and Beadle 1996). If the focal male delivered a perched song, we measured duration (s) of each singing bout to the nearest 1/100th of a second. If the bird delivered a flight song display, we categorized (1) perch site location (brush or ground), (2) perch position (ground, or lower ⅓, middle ⅓ or upper ⅓ of the bush), and (3) body orientation (degree heading) at the beginning and end of each flight song display. We also measured duration (s), distance flown (m), and height (m) above the perch site, as well as display rotation, defined as the degree difference in body orientation from display initiation to termination. Body orientation and display rotation were measured using a compass. Perched song and flight song display duration were measured using a stopwatch and recorded to the nearest 1/100th of a second. Perched songs or flight song displays began when the bird initiated its song, and ended when the bird either stopped singing or landed after a flight song display. We estimated flight song display distance and maximum height attained to nearest decameter. We periodically checked our estimates for accuracy by measuring distance and height. No estimates deviated >5% from the measured distances. We also recorded the apparent cause of the perched song or flight song display (i.e., no known cause or either a Cassin's Sparrow or other species moving within 50 m of a focal bird).

We used multivariate analysis of variance (MANOVA) followed by one-way analysis of variance (ANOVA) to compare non-transformed variables (Johnson and Wichern 1996) between (1) perched song bouts and flight song displays and (2) flight song displays initiated for no apparent reason and those initiated because of the presence of another bird. Data were collected 1–6 days apart. We did not collect data from the same area in sequential visits. Individual males and their territories were not discernible because male Cassin's Sparrows were not individually marked. Therefore, we considered each display as an independent sample to avoid complications with non-independence and pseudo-replication (Sokal and Rohlf 1981). We used a Chi-Square test for goodness of fit when comparing variables of the flight song displays (Sokal and Rohlf 1981). All statistical tests were performed at the 0.05 level of significance. The Shapiro-Wilk W-statistic was used to assess normality (Cody and Smith 1991) and Levene's test was used to test homogeneity of variance (Milliken and Johnson 1992).

RESULTS AND DISCUSSION

We observed 164 instances of male Cassin's Sparrows delivering displays; 58 perched songs and 106 flight song displays. Male Cassin's Sparrows that delivered flight song displays flew a mean distance of 8.1 m (SE = 0.66) (range 1.7–50 m) and reached a mean height of 3.6 m (SE = 0.17) (range 0.9–10 m). Duration of perched song bouts ($\bar{x} = 2.0$ s; SE = 0.44) and flight song displays ($\bar{x} = 2.5$ s; SE = 0.44) (range 0.59–9.09 s) did not vary ($P = 0.34$). Males performing flight song displays rotated an average of 96.1° (SE = 4.68) (range 0–180°).

All perched songs ($N = 58$) were delivered from the upper ⅓ of mesquite trees. Most flight song displays (97.8%) were initiated from mesquite trees ($\chi^2 = 91.4$; 1 df; $P < 0.001$), usually from the upper ⅓ (92.3%) ($\chi^2 = 282.9$; 2 df; $P < 0.001$). Most flight song displays ended in mesquite trees (95.1%) rather than the ground (4.9%) ($\chi^2 = 81.4$; 1 df; $P < 0.001$), usually in the upper ⅓ (82.3%) of a mesquite tree ($\chi^2 = 191.3$; 2 df; $P < 0.001$).

Flight song display variables did not vary (Wilks' $\lambda = 0.97$; $P = 0.48$) among displays initiated for no apparent cause(s) and those apparently initiated in response to Cassin's Sparrows or other species within 50 m of focal males for flight duration (1.9 s versus 2.7 s), flight distance (6.8 m versus 4.9 m), flight height (3.3 m versus 2.1 m), and body rotation (115.9° versus 52.5°). However, male Cassin's Sparrows were more likely to deliver a flight song display than a perched song when conspecifics moved within 50 m of the focal male ($\chi^2 = 22.9$; 1 df; $P < 0.001$). Flight song displays (92%) occurred more often than perched song bouts (8%) when other birds traveled within 50 m of a focal male ($N = 38$) ($\chi^2 = 26.9$; 1 df; $P < 0.001$). Conversely, flight song displays (48%) and perched songs (52%) occurred at similar rates when there was no apparent cause ($\chi^2 = 0.22$; 1 df; $P = 0.63$).

Flight song display variables did not vary ($P > 0.21$) between those displays elicited by Cassin's Sparrows versus other species. However, 42% of the instances in which male Cassin's Sparrows delivered a flight song display were evidently caused by the presence other Cassin's Sparrows. Other species apparently eliciting flight song displays included Northern Mockingbirds (*Mimus polyglottos*), Barn Swallows (*Hirundo rustica*), Common Grackles (*Quiscalus quiscula*), and White-crowned Sparrows (*Zonotrichia leucophyrys*).

Many species deliver primary songs from perches located (1) in vegetation with an open structure (Lein 1981, Groschupf and Mills 1982) or (2) high in the vegetation from exposed perches (Catchpole and Slater 1995). Such behavioral adaptations may have evolved in response to song attenuation, interference from the vegetation and ground, spherical spread of the song, atmospheric absorption, and scattering (Wiley 1991, Catchpole and Slater 1995). Consequently, in grasslands or in grasslands with scattered wood vegetation, it would be selective for birds to deliver their song from the highest or above the highest vegetation (Wiley 1991). Our data corroborates this hypothesis, with Cassin's sparrows both singing and delivering flight song displays from the upper parts of mesquite trees.

Song properties are often associated with the specific habitat in which they are delivered (Morton 1975, Wiley 1991) where selection should favor songs which maximize broadcast areas (Morton 1975). Consequently, the development of flight song displays in grassland birds (sensu Post and Greenlaw 1975) may allow song delivery above the vegetation profile to (1) maximize sound transmission, (2) minimize sound attenuation, (3) allow for evasive action should a predator appear (Catchpole and Slater 1995), and (4) compensate for the potential lack of available perches in grassland habitats (Morton 1975, Post and Greenlaw 1975, Wiley 1991). Cassin's Sparrows initiate and terminate their flight song display from the upper parts of mesquite trees and generally use taller trees when both singing and performing displays (Schnase et al. 1991). Flight height averaged 3.6 m, which is high enough to allow Cassin's Sparrows to see over the surrounding vegetation to detect other birds or predators. These types of selection patterns may allow Cassin's Sparrows to (1) search for predators before initiating flight song displays, (2) avoid predators once in flight and (3) avoid physical barriers that inhibit sound transmission.

Nevertheless, the behavioral function(s) of flight song displays remain unclear, and the significance of such behavior probably varies from species to species (Wells and Vickery 1994). Ritchison (1991) hypothesized that Common Yellowthroats rarely perform flight song displays in response to the presence of conspecific males or females and suggested that this behavior may have evolved as a predator detection or distraction mechanism. This hypothesis may explain why Vesper Sparrows perform flight song displays late in the breeding season when such a behavior would not be associated with territorial interactions or mate attraction (Wells and Vickery 1994). Conversely, Swamp Sparrows deliver their flight song displays most frequently early in the breeding season, when males are first establishing territories (Nowicki et al. 1991).

Schnase et al. (1991) reported that unmated male Cassin's Sparrows rarely deliver flight songs, suggesting this behavior (1) is not primarily performed for mate attraction purposes, (2) may be evidence of paired birds, or, since this behavior was also observed in the absence of females, (3) may be used to maintain territorial boundaries. However, they hypothesized that territorial establishment and defense is attained primarily by perched song (Schnase et al. 1991). Conversely, Wolf (1977) suggested that mated Cassin's sparrows perform fewer flight songs than unmated males. Our findings also suggests that the flight song display may be important for mate attraction purposes, because flight song displays were more common when conspecifics were nearby. However, we hypothesize that this behavior has other potential functions, such as territorial establishment or defense, as well as predator detection.

In the present study, when there were no apparent causes of perched song or flight song display, each behavior was performed proportionately. Conversely, when conspecifics (sex unknown) were observed moving within 50 m of a male Cassin's Sparrow, a flight song display was delivered 92% of the time. Apparently, conspecifics elicit flight song displays and could have mate attraction and/or territory defense functions.

When performing flight song displays, male Cassin's Sparrows rotated an average of 96° from initiation to termination, but showed no preference for a particular degree orientation. Males may rotate to (1) locate or avoid potential predators if they are present (sensu Ritchison 1991), (2) identify or locate available females (sensu Schnase et al. 1991), (3) locate neighboring males that would otherwise be unobservable, or (4) broadcast their song over as wide a range as possible (Breitwisch and Whitesides 1987).

This paper addresses both the physical parameters and potential functions of the flight song display behavior in Cassin's Sparrows. Our study suggests that the flight song display behavior of Cassin's Sparrows may have multiple functions including mate attraction, territorial defense, and predator detection or distraction mechanisms. To address specific hypotheses involving the function of flight song display behavior in Cassin's Sparrows future research should pursue flight song characteristics in the presence and absence of predators and birds of known sex.

ACKNOWLEDGEMENTS

Financial and logistic support for this research were provided by the Department of Range, Wildlife, and Fisheries Management, Texas Tech University. This is manuscript T-9-859 of the College of Agricultural Sciences and Natural Resources, Texas Tech University. We are grateful to P. Vickery, C. M. Blem, and C. R. Chandler for providing comments on earlier drafts of this work.

LITERATURE CITED

BOCK, C. E. AND W. C. SCHARF. 1994. A nesting population of Cassin's sparrows in the sandhills of Nebraska. Journal of Field Ornithology 65:472–475.

BORROR, D. J. 1971. Songs of *Aimophila* sparrows occurring in the United States. Wilson Bulletin 83:132–151.

BREITWISCH, R. AND G. H. WHITESIDES. 1987. Directionality of singing and non-singing behavior of mated and unmated northern mockingbirds (*Mimus polyglottos*). Animal Behavior 35:331–339.

CAPP, M. S. AND W. A. SEARCY. 1991. An experimental study of the song type function in the bobolink (*Dolichonyx oryzivorus*). Behavioral Ecology and Sociobiology 28:179–186.

CATCHPOLE, C. K. AND P. J. B. SLATER. 1995. Bird song: biological themes and variations. Cambridge University Press, Great Britain.

CODY, R. P., AND J. K. SMITH. 1991. Applied statistics and the SAS programming language. Third ed. Elsevier Science Publishing Co., Inc. New York, N. Y. 403 pp.

GROSCHUPF, K. AND G. S. MILLS. 1982. Singing behavior of the five-striped sparrow. Condor 84:226–236.

JOHNSON, J. C., JR. 1956. Breeding of Cassin's sparrow in Oklahoma. Wilson Bulletin 68:75–76.

JOHNSON, R. A. AND D. W. WICHERN. 1996. Applied multivariate statistical analysis. Third Ed. Prentice Hall, Englewood Cliffs, N. J.

LEIN, M. R. 1981. Display behavior of ovenbirds (*Seirus aurocapillus*). II. Song variation and singing behavior. Wilson Bulletin 93:21–41.

MILLIKEN, G. A. AND D. E. JOHNSON. 1992. Analysis of messy data volume I: designed experiments. Chapman and Hall, New York, N. Y.

MORTON, E. S. 1975. Ecological sources of selection on avian sounds. American Naturalist 109:17–34.

NOWICKI, S., HUGHES, M., AND P. MARLER. 1991. Flight songs of swamp sparrows: alternative phonology of an alternative song category. Condor 93: 1–11.

POST, W. AND J. S. GREENLAW. 1975. Seaside sparrow displays: their function in social organization and habitat. Auk 92:461–492.

RISING, J. D. AND D. B. BEADLE. 1996. A guide to the identification and natural history of the sparrows of the United States and Canada. Academic Press, Inc. San Diego, CA.

RITCHISON, G. 1991. The flight songs of common yellowthroat: description and causation. Condor 93:12–18.

SCHNASE, J. L. 1984. The breeding biology of Cassin's sparrow (*Aimophila cassinii*) in Tom Green County, Texas. M. S. Thesis, Angelo State University, San Angelo, Texas, 108 pp.

SCHNASE, J. L., W. E. GRANT, T. E. MAXWELL, AND J. J. LEGGETT. 1991. Time and energy budgets of Cassin's sparrow (*Aimophila cassinii*) during the breeding season: evaluation through modeling. Ecological Modeling 55:285–319.

SOKAL, R. R. AND F. J. ROHLF. 1981. Biometry. Second ed. W. H. Freeman and Company, San Francisco, CA.

WELLS, J. V. AND P. D. VICKERY. 1994. Extended flight-songs of vesper sparrow. Wilson Bulletin 106:696–702.

WILEY, R. H. 1991. Associations of song properties with habitats for territorial oscine birds of eastern North America. American Naturalist 138:973–993.

WOLF, L. L. 1977. Species relationships in the avian genus *Aimophila*. Ornithological Monograph No. 23. American Ornithological Union. Washington, D. C. 220 pp.

Received 16 September 1998; accepted 08 March 1999.

RANGE EXPANSION OF FISH CROW IN NORTHEAST TEXAS

Matt White[1]
2518 Monroe, Commerce, Texas 75428

ABSTRACT.—The Fish Crow (*Corvus ossifragus*) is found primarily in the southeastern United States, along the Gulf and Atlantic coasts, from Texas to Massachusetts, and inland along major waterways, rivers, swamps and lakes (AOU 1998). In the past several decades, particularly since 1960, the population has increased markedly, especially along inland waterways and rivers, but also north along the Atlantic seaboard (Potter *et al* 1980, Veit and Peterson 1993). This range expansion has been dramatic, and is apparently still underway as evidenced by the fact that they continue to increase in locations where they were unknown as recently as five years ago. In addition, there is strong evidence that a portion of the population now undertakes some form of spring and fall migration—with the most recently colonized areas being abandoned in winter. During March migrant Fish Crows begin appearing along the Mississippi River north to Illinois (Bohlen 1989), and up the Atlantic coast to Massachusetts (Veit and Peterson 1993). These dates are also consistent with the species spring arrival in recently colonized parts of northeast Texas. The range of the Fish Crow in northeast Texas was delineated from information gleaned from published reports and personal observations from 1991-1999.

CURRENT STATUS AND DISTRIBUTION IN NORTHEAST TEXAS

Fish Crows are now fairly common permanent residents locally in Bowie County, especially in the Texarkana vicinity, in the Red River valley (C. Mills *pers. comm.*) and along the Sulphur River, in the vicinity of Lake Wright Patman, in Bowie and Cass counties. They are also permanent residents in the vicinity of Caddo Lake, and locally, or irregularly, west along the Little Cypress Bayou to Lake O' the Pines, in Harrison and Marion counties (TOS 1995). They occur along White Oak Creek—a large heavily wooded tributary of the Sulphur River—west to Morris County, and perhaps even farther west. They are uncommon permanent residents along the Red River valley west to about the western boundary of Bowie County with small numbers occasionally lingering west to Fannin County. The exact western limit of their usual winter range is still unclear.

During spring or early summer they migrate along the Red and Sulphur rivers, and many of the larger tributary creeks, west to Fannin County and to Cooper Lake, in Hopkins and Delta counties. They are conspicuous summer residents along Pecan Bayou, a large tributary creek in Red River County, and along the Sanders Creek to Pat Mayse Lake in Lamar County. A few are found in summer in northern Fannin County along Bois d'Arc Creek to Lake Crockett and Coffee Mill lakes on the Caddo National Grasslands. They are accidental along the Sabine River north to Lake Tawakoni, in Rains and Van Zandt counties, and its tributary, Lake Fork Creek, to Lake Fork Reservoir, in Wood County. The summer range of the species is mapped in figure 2.

This spring migration begins in March, perhaps occasionally in late February, and continues through early June. There is very little evidence of fall migration though, as birds simply vanish from these recently colonized areas sometime between late July and October.

HABITAT

In northeast Texas Fish Crows are found along wooded rivers and creeks, particularly those that are seasonally flooded, as well as lakes and other wetlands. However, in the immediate vicinity of Texarkana Fish Crows occur in urban and developed areas such as shopping malls and parking lots.

---

[1] Correspondence e-mail: mwhite@ssisd.net

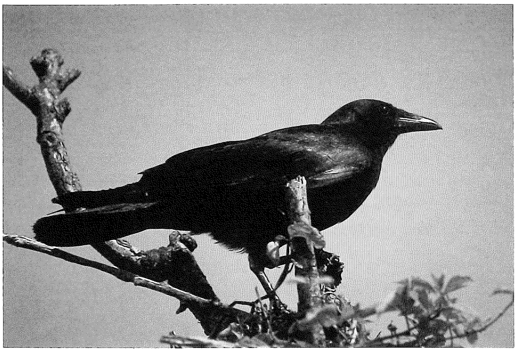

Fig. 1. Fish Crow (*Corvus ossifragus*). Photo by G. Armistead/VIREO.

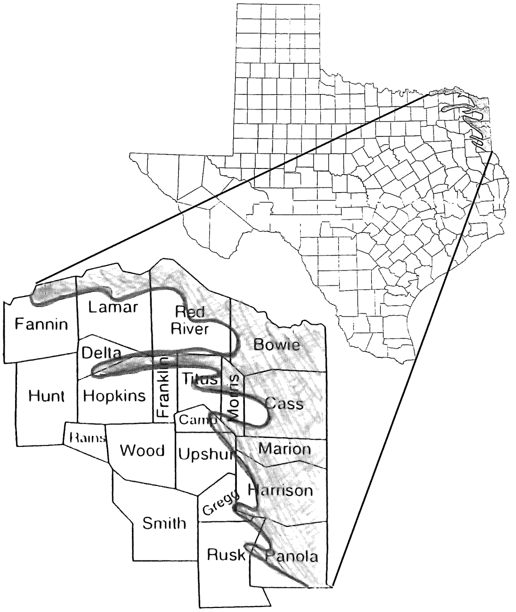

Fig. 2. The summer range of the Fish Crow in Northeast Texas. This species withdraws to the extreme eastern edge of the region in winter, although the exact limit of their distribution at that season is unclear. See text for details.

RANGE EXPANSION

Fish Crows began spreading into northeast Texas via the Red River from nearby Arkansas and Louisiana less than forty years ago. To illustrate just how this quickly this expansion occurred, consider that the AOU (1957) did not include northeast Texas in the range of the Fish Crow. At that time, the species was apparently still confined to the southeastern part of the state and along the Gulf Coast. Sometime shortly before 1960 they began expanding north along the Mississippi River reaching Memphis, and west along the Red River to Shreveport (Lowery 1960). They continued to spread along the Mississippi River, reaching Illinois by 1962 (Bohlen 1989), and west along the Red River and several of the other large Mississippi River tributaries. By 1967 pioneering Fish Crows were already being recorded along the Red River west to Idabel, Oklahoma (Sutton 1967). A lack of observers on the Texas side of the river delayed their discovery until 1973. In June of that year Fish Crows were found at three separate locations in extreme northeast Texas. On June 14, an estimated eight–ten Fish Crows were discovered at Caddo Lake-Little Cypress Bayou, in Marion and Harrison counties, while the next day, four more were found at the spillway of Lake Wright Patman, in Bowie County. The following day, on June 16, an additional thirteen were observed in the Red River valley west of Texarkana (Oberholser 1974). However, based on the evidence from nearby Oklahoma, it seems clear that these birds had been in the area for several years.

Although most of these pioneering birds were initially detected in summer, it wasn't long before they were wintering in northeast Texas. The first winter report from northeast Texas was a record of seven birds from an undisclosed location in Harrison County, most likely Caddo Lake, on February 7, 1976 (Williams 1976). The following winter, on December 19, 1976, seven were considered noteworthy on the Lake O' the Pines Christmas Bird Count (CBC) (Risner 1977). However, they were first recorded on the Texarkana, Arkansas CBC, just outside the state, on December 29, 1965

(Gardner 1966). In the same month a whopping 249 were counted on the Shreveport CBC, in nearby Louisiana (Stewart 1966), so it is likely they were overlooked as winter residents in nearby northeast Texas for a few years.

Unfortunately, little is known about their further spread throughout the region until about the late 1980s, when observers conducting fieldwork for the Texas Breeding Bird Atlas Project found they had navigated the Red River west to Lamar County. A short time later, in April and May 1990 they were discovered even farther west near Lake Crockett, on the Caddo National Grasslands, in Fannin County, where as recently as 1988 Pulich (1988) had failed to mention this species. Since then they have been reported annually, from spring through fall, along the Red River west to Fannin County. They appear to be firmly entrenched here and are probably present along most of the larger creeks that feed into the Red River as well. For example, in June 1995, they were recorded for the first time on the Dalby Springs Breeding Bird Survey Route (on three of the 50 stops) in Red River County. These birds were found near a large tributary of the Sulphur River, in the southeast corner of the county, and along Pecan Bayou, a large tributary creek flowing east into the Red River in the northern part of the county.

The first evidence of movement west along the Sulphur River, probably from the well-established population at Lake Wright Patman, was found in May 1994, with the appearance of two stragglers in the impounded timber at the recently constructed Cooper Lake, in Delta County. The following year two or three were heard in the same area several times in June. The first evidence of a larger movement into the Cooper Lake area was from March through July 1996, when numerous birds were present at various parts of the lake. A single bird heard calling on March 15, 1997 below the Cooper Dam, in Hopkins County, provides the lake with its earliest spring record. Several were heard in June and July of 1997 from the upper, wooded, portions of this reservoir and again in spring and summer of 1998 and 1999.

On June 22, 1999 a pair of calling birds was found in wet swampy woods along White Oak Creek, near I-30, on the White Oak Wildlife Management Area, in Morris County. Although this particular site is only a few miles above the well-established population at Lake Wright Patman, and the habitat is ideal, additional fieldwork will be necessary to clarify their status and distribution on this tributary which begins in Hopkins County and flows eastward before draining into the Sulphur River near the upper end of Lake Wright Patman.

Along the Sabine River or its tributaries reports of Fish Crows are not very common. The only regional reports from this watershed are from Lake Fork, in Wood County, where one was reported on February 28, 1992, and from below the dam at Lake Tawakoni, in Rains and Van Zandt counties, where two were heard calling several times in June and July of 1996. Additionally, several were heard calling in Smith County, in the Tyler vicinity in the spring of 1997 (Murry Gardler *pers. comm.*).

Although there is still very little evidence of breeding in northeast Texas—nesting is certainly being overlooked. The only evidence of nesting involves several that were seen carrying nesting material toward a heron rookery near Big Cypress Bayou, in Harrison County, in June and July 1990 (Kenneth Nanney *pers. comm.*). Observers in areas where Fish Crows are summer residents in northeast Texas should diligently search for additional clues to further document this species breeding in the region.

ACKNOWLEDGMENTS

I wish to thank Charles Mills, Warren Pulich, Greg Lasley and Jack Eitniear for reading the manuscript and making helpful suggestions. In addition, Charles provided extensive information about the species in southwest Arkansas and the Texarkana area. Thanks to Murray Gardler and Kenneth Nanney for providing additional unpublished information.

LITERATURE CITED

American Ornithologists' Union.. 1957. Check-list of North American Birds. 5th ed. American Ornithologists' Union, Baltimore.

AMERICAN ORNITHOLOGISTS' UNION.. 1998. Check-list of North American Birds. 7th ed. American Ornithologists' Union, Washington DC.
BOHLEN, H. DAVID. 1989. The Birds of Illinois. Indiana University Press, Indianapolis.
BURLEIGH, THOMAS D. 1958. Georgia Birds. University of Oklahoma Press, Norman.
GARDNER, CHARLES. 1966. Texarkana, Ark. Audubon Field Notes 20 (2) 294–95.
GODFREY, W. E. 1986. The Birds of Canada. Revised ed. National Museums of Canada, Ottawa.
LOWERY, GEORGE H. 1960. Louisiana Birds. 2nd edition. Louisiana University Press, Baton Rouge.
OBERHOLSER, H. C. 1974. The Bird Life of Texas. University of Texas Press, Austin.
POTTER, ELOISE F., JAMES F. PARNELL AND ROBERT P. TEULINGS. 1980. Birds of the Carolinas. University of North Carolina Press, Chapel Hill.
PRICE, JEFF, SAM DROEGE AND AMY PRICE. 1995. The Summer Atlas of North American Birds. Academic Press, San Diego.
PULICH, WARREN. 1988. The Birds of North Central Texas. Texas A&M University Press, College Station.
RISNER, LYN. 1977.Lake O' The Pines, Tex. *American Birds* 31 (4) 776.
ROOT, TERRY. 1988. Atlas of Wintering North American Birds. University of Chicago Press, Chicago.
STEWART, JAMES JR. 1966. Shreveport La. *Audubon Field Notes* 20 (2) 296.
SUTTON, GEORGE M. 1967. Oklahoma Birds. University of Oklahoma Press, Norman.
TEXAS ORNITHOLOGICAL SOCIETY. 1995. Checklist of the Birds of Texas, 3rd ed. Capitol Printing, Austin.
VEIT, RICHARD R. AND WAYNE R. PETERSEN. 1993. Birds of Massachusetts. Massachusetts Audubon Society, Boston.
WILLIAMS, FRANCIS. 1976. Southern Great Plains. American Birds 30 (3) 735–39.

Received 19 July 1999; accepted 1 November 1999.

SHORT COMMUNICATIONS

BRONZED COWBIRDS (*MOLOTHRUS AENEUS*) STILL PARASITIZE HOODED ORIOLES (*ICTERUS CUCULLATUS*) IN THE LOWER RIO GRANDE VALLEY OF TEXAS

TIM BRUSH[1]
Department of Biology, University of Texas-Pan American, 1201 West University Drive, Edinburg, TX 78539

The Hooded Oriole (*Icterus cucullatus*) and other oriole species were once thought to be the preferred hosts of the Bronzed Cowbird (*Molothrus aeneus*), based on early research (summarized in Friedmann 1963) in the Lower Rio Grande Valley area (LRGV; Cameron, Hidalgo, Willacy, and Starr Cos.). Once very common in natural and altered habitats in the LRGV, Hooded Orioles have declined severely since about 1950 (Oberholser 1974). Carter (1986) did not find the Hooded Oriole breeding at Santa Ana National Wildlife Refuge, and mentioned that brood parasitism may have been one of the main causes of their decline. Carter (1986) found that Bronzed Cowbirds were mainly parasitizing species other than orioles, such as Green Jay (*Cyanocorax yncas*), Long-billed Thrasher (*Toxostoma longirostre*), Northern Mockingbird (*Mimus polyglottos*), and Olive Sparrow (*Arremonops rufivirgatus*). Likewise, Sealy et al. (1995) found few records of oriole parasitism by Bronzed Cowbirds in Central America. Since 1994, I have opportunistically collected records of Hooded Oriole nesting and territory occupation at Santa Ana National Wildlife Refuge (hereafter

---

[1] Correspondence Email: TBRUSH@PANAM.EDU.

Table 1. Evidence of nesting by Hooded Orioles in selected areas of Lower Rio Grande Valley, Texas, 1994–1999. All locations are in Hidalgo Co., except for Salineño, which is in Starr Co.

Date	Location	Attending birds	Fledglings
6 June 1994	Edinburg	female, adult male	2 Bronzed
1 June 1996	McAllen	female, adult male	1 Bronzed
1 July 1996	Edinburg	female, adult male	1 Brown-headed
26 June 1997	Santa Ana	female, adult male	2 Hooded
14 July 1997	Edinburg	subadult male	1 Bronzed*
15 August 1997	Edinburg	female	1 Bronzed#
26 July 1998	Edinburg	female	1 Bronzed
26 July 1999	Edinburg	female, subad. Male	1 Bronzed
8 August 1999	Salineño	female, adult male	1 Bronzed

* Two other Bronzed Cowbird fledglings in same yard, but not fed by oriole.
# Recently fledged cowbird, thus different from 14 July fledgling.

Santa Ana), at Bentsen-Rio Grande Valley State Park (hereafter Bentsen), and in the towns of McAllen, Edinburg, and Salineño, also in the LRGV. I wanted to determine whether Bronzed Cowbirds had switched completely to non-oriole species, given the rarity of most orioles in the LRGV. Secondarily, I wanted to determine what habitats Hooded Orioles still used in the LRGV.

During the period April 1994–August 1999, I recorded Hooded Orioles a) observed during regular field work at Santa Ana and Bentsen (Brush 1998, 1999), b) observed during daily activities in suburban habitat in Edinburg, c) observed during canoe trips along the Rio Grande in Starr Co., and d) reported by A. Vasek, who resides in McAllen. I recorded the sex, age (if possible), and location of any Hooded Orioles observed, and the presence of fledgling orioles or cowbirds. Typically I watched birds for at least 20 minutes, to accurately determine the number and identity of fledglings. I found no nests during this study, and coverage was somewhat uneven in different years, but I collected enough data to determine if cowbirds still parasitize Hooded Orioles.

Hooded Orioles maintained one breeding territory near the northern edge of Santa Ana during 1994–1998. Usually a subadult male held the territory, which seemed centered on areas containing native sabal palms (*Sabal texana*) or exotic fan palms (*Washingtonia* spp.), in and near the northern edge of the refuge. Typically the male would move from palm to palm, singing and calling, from April–July of most years. Despite regular field work in most sections of Santa Ana, I found no other Hooded Oriole territories.

Hooded Orioles were more erratic at Bentsen. Absent there during other years, individuals were occasionally seen during June–July 1998. On 15 June 1998, a female and singing adult male were observed near the western edge of Bentsen, but no consistent territory was established. There are no palms in Bentsen, although a few occur on private lands adjacent to the park.

Hooded Orioles were sometimes observed in fairly open residential areas of Edinburg and McAllen, but were not usually detected until family groups were seen (see below). I occasionally observed Hooded Orioles in the small town of Salineño, about 0.5 km from the river, or along the river within 0.75 km of the town.

Hooded Orioles were observed attending fledglings during most years, primarily in Edinburg (Table 1). Typically, an oriole pair was observed bringing food to one or two fledglings. In 78% of the 9 observations, the Hooded Orioles attended and fed Bronzed Cowbirds, but I also saw Brown-headed Cowbird (*Molothrus ater*) and Hooded Oriole fledglings.

These results show that Hooded Orioles still breed in the LRGV, but are absent from most of Santa Ana and Bentsen, possibly because they lack nest-sites. Areas with palm trees, evidently the main nesting sites for Hooded Orioles in the LRGV in recent years (K. Baughman, J. Paz, and S. Bentsen, pers. comm.), still support Hooded Orioles in relatively small numbers. Doubtless most LRGV towns have a few pairs of Hooded Orioles, and the species nests in the remnant sabal palm forest in Brownsville (J. Paz, pers. comm.).

The results shown here suggest that Hooded Orioles most frequently raise Bronzed Cowbirds.

However, the data may be biased by the fact that cowbird fledglings are probably more conspicuous than oriole fledglings, due to the cowbirds' louder begging calls. Therefore, I may have been more likely to miss Hooded Oriole fledglings. In any case, Bronzed (and Brown-headed) Cowbirds still evidently seek out, find, and successfully parasitize Hooded Orioles in the LRGV. Although cowbirds have been shown to be generalists and mainly parasitize other species in the LRGV, they still parasitize Hooded Oriole nests when they can find them.

I thank the U.S. Fish and Wildlife Service (Region 2) and the American Birding Association for funding much of the field work, Ann Vasek for reporting on fledglings in her yard, Catherine C. Brush for her continued support of my ornithological research, and Dan Brooks for his comments on the manuscript.

Literature Cited

BRUSH, T. 1998. A closer look: Altamira Oriole. Birding 30:46–53.

BRUSH, T. 1999. Current status of Northern Beardless-Tyrannulet and Tropical Parula in Bentsen-Rio Grande Valley State Park and Santa Ana National Wildlife Refuge, southern Texas. Bulletin of the Texas Ornithological Society 32:3–12.

CARTER, M. D. 1986. The parasitic behavior of the Bronzed Cowbird in South Texas. Condor 88:11–25.

FRIEDMANN, H. 1963. Host relations of the parasitic cowbirds. U.S. National Museum Bulletin 233:1–276.

OBERHOLSER, H. C. 1974. The bird life of Texas, Vol. 2 (E. B. Kincaid, Jr., ed.). University of Texas Press, Austin.

SEALY, S. G., J. E. SANCHEZ, R. G. CAMPOS R., AND M. MARIN. 1995. Bronzed Cowbird hosts: new records, trends in host use, and cost of parasitism. Ornitologia Neotropical 8:175–184.

Received 30 July 1999; accepted 16 September 1999.

NOTES AND NEWS

INFORMATION FOR CONTRIBUTORS

Attention Authors.—The *Bulletin of the Texas Ornithological Society* publishes original research reports and short communications in the field of Texas Ornithology. Articles on a wide range of subjects are accepted, including documentation of new Texas records, interpretations of laboratory and field studies, historical perspectives on Texas Ornithology, and developments in theory and methodology. Although the emphasis is on Texas birds the *Bulletin* accepts manuscripts which advance the knowledge of ornithology in general.

Manuscripts, including tables, should be double-spaced on one side of 8½ × 11 inch (22 × 28 cm) white paper. *All pages should be numbered with the last name of the principle author on the top of each page and on the back of every figure.* Manuscripts should follow the format observed in this issue. Feature articles should include an abstract and a "LITERATURE CITED" section. Short Communications do not need an abstract.

Scientific and common names of North American birds must follow the 1998 A.O.U. Checklist and supplements. The 24-hour clock (0730), the continental dating convention (03 January 1989), and the metric system should be used.

Submit an original and two complete copies of the manuscript. Manuscripts may be mailed, faxed or e-mailed to the editor. Manuscripts will be edited and reviewed by two individuals who are knowledgeable in the subject. A voluntary page charge of $35.00 per printed page will be assessed on manuscripts accepted. **Payment of complete page charges will result in earlier publication.** Authors will be sent proofs prior to the final printing; information on ordering reprints will be supplied at that time.

Jack Clinton Eitniear, Editor, 218 Conway Drive, San Antonio, Texas 78209-1716. Fax: (210) 828-9732 E-mail: CSTBInc1@aol.com.

The *Bulletin* of the *Texas Ornithological Society* is issued to all members not in arrears for dues. Membership in the *Texas Ornithological Society* is open to all persons interested in the observation, study, and conservation of birds in Texas. Membership dues are $14.00 per year (student), $20.00 per year (active), $40.00 per year (sustaining), $300.00 paid once, or in $75.00 annual payments over a period not to exceed four years (life). Inquiries regarding membership should be addressed to Texas Ornithological Society, Membership Services, PMB #189, 6338 N. New Braunfels Ave., San Antonio, TX 78209. www.texasbirds.org