

motte within the territory of the roadside pair. Mourning Dove (*Zenaida macroura*) may have nested within the territories of both pairs.

My observations of the breeding behavior of these two pairs of Dickcissels agree with my earlier observations in Marlboro County, South Carolina (McNair, 1989).

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Dickcissels Breed In Marlboro County, S. C.

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I confirmed breeding of Dickcissels (*Spiza americana*) at two locations in Marlboro County, S. C. in 1988. Possible breeding was noted at two other localities in the county.

Localities - The two confirmed locations are 2.5 km apart. The first is on the Dean property beside SR-113, 2 km below the North Carolina state line. The second is on the Wallace property, beside US Route 1, 4 km below the state line. Both localities, as is the case with the two possible breeding sites, are on the level to gently sloping Upper Coastal Plain at 65 m above sea level, outside the Sandhills Province. The two possible breeding sites are on the grounds of Victory Christian Center, on SR-47, Bennettsville, and beside SR-482 near the Bethel Church, 1 km N of SC Route 9, 9.5 km NW of Bennettsville.

I visited the two confirmed breeding locations five times each for a total of 7.5 h from 10 to 23 June, and 20 July at the Dean property, and for a total of 6 h on 11 and 23 June and 20-29 July at the Wallace property. I found two pairs and an unmated male at each locality. I watched an unmated male sing for 45 min on 16 June at the Victory Christian Center and another unmated male sing for 50 min on 24 June at the Bethel Church locality.

Habitat - The two pairs at the Dean property inhabited a 2.5 ha rectangular, very dense, 4-5 year-old *Lespedeza* pasture. The vegetation was 1.2 to 1.7 m high in June. The unmated male at this site occupied a larger pasture with younger, less dense *Lespedeza* mixed with grasses and forbs. The two pairs at the Wallace property inhabited separate *Lespedeza* pastures, of varying height and density, mixed with some grasses. Some *Lespedeza* patches on both territories were over 2 m high in June. The unmated male at this locality frequented a habitat similar to that frequented by the unmated male at the Dean property. The unmated male at the Victory Christian Center also occupied habitat similar to those of unmated males at both confirmed breeding localities. The Bethel Church unmated male occupied a

very different habitat, a small shrubby pasture adjacent to a rural yard and grassland, and with a *Rubus* - grassland patch that had a dense matted ground cover similar to the habitats frequented by the other birds.

Breeding Confirmation - I confirmed breeding at the Dean property on 23 June. At 1904 h, I flushed a female and two juveniles, one of which had a short tail. I saw one fully fledged juvenile at close range at this site on 20 July. At the Wallace property, I confirmed breeding on 24 July when I flushed 2-3 juveniles, which did not permit a close approach, and which were not with adults.

Breeding Phenology - Nesting was underway when I first visited each confirmed location on 10 and 11 June. At the Dean property, the male of the successful pair frequented the vicinity of the presumed nest site and accompanied the female, both near and away from the nest, during the nestling stage. Both sexes generally permitted me to approach them closely. The male often gave a hard "chink" note and a metallic "tic" note in response to intruders or predators, and to maintain contact with the female. During the nesting stage, the male sang only occasionally.

The other pair at the Dean place did not breed successfully. During June, this second male sang frequently, rarely called, and did not accompany the female. Once, on 16 June, the second female joined the male in its main song tree. I flushed this female only several times, and do not know if she nested.

At the Wallace property, the circumstances were similar, but neither pair nested as early as the successful pair at the Dean property. At the Wallace place neither pair appeared to have proceeded beyond the incubation stage: both males sang frequently but uttered no call notes, and on one occasion only, one male briefly accompanied a female. This male only began accompanying his female regularly on 23 June, though he sang frequently. In late July, this male accompanied his female, now tailless, and called regularly in the vicinity of a presumed nest site, while the female delivered food on 24 July. I am not sure which pair produced the 2 to 3 juveniles that I saw on 24 July, at another site, outside the activity spaces of both breeding pairs.

All males, mated and unmated, spent most of their time singing during June. On 16 June, the unmated male at the Dean property intruded on the other birds' breeding site, but quickly retreated, possibly in response to songs from both paired males. The unmated male at the Wallace property had shifted its territory by 20 July and still sang. The two paired males also still sang some on this date. In late July at both confirmed breeding localities, Dickcissels began to flock together, as I heard few of the hard "chink" notes, which are often given in agonistic encounters.

Vocalizations - Both sexes uttered a hard loud "chink" and a softer metallic "tic" call note. "Chinks" were used by alarmed birds against intra- or interspecific intruders near and away from the nest, either by separate individuals or as a pair traveling together. Pairs sometimes engaged in vigorous "chink" calling-bouts when I or a foreign male Dickcissel intruded on a nesting area. The breeding male displayed by occasionally jerking and fanning his tail to maintain the pair bond. "Tics" were used as contact notes between members of a mated pair or between individuals of a small post-breeding flock.

All eight adult males sang from telephone wires, the tops of shrubs or small trees at the border of their territories, or within their territories from the tops of *Lespedeza* or other forbs. Occasionally, Dickcissels sang in flight. All individuals' songs were different and recognizable, with the exception of the three Wallace

property males, which I could not distinguish by ear. Songs and other vocalizations are archived at the Florida Museum of Natural History (FMNH). Individual plumage characteristics distinguished the Wallace property males, as well as the three at the Dean property. Males engaged in countersinging bouts frequently and occasionally sang at night. Several males sang briefly in response to my intrusion into the area.

Agonistic Behaviors - Other than countersinging, I saw few intraspecific agonistic interactions. On 10 and 22 June, the male of the successful pair on the Dean property twice briefly chased and expelled the other mated male when it approached the nesting female with food.

I also saw few interspecific interactions. Mated males at both confirmed breeding localities chased adult Field Sparrows (*Spizella pusilla*) four times. A displaying adult male Red-winged Blackbird (*Agelaius phoeniceus*) on 11 June once displaced a singing Dickcissel from the top of a *Lespedeza*. The nesting female at the Dean property repeatedly threatened me, opening her wings with carpals raised forward and calling "chink" when I approached the vicinity of her nest on 16 June.

Food - Small grasshoppers were abundant at all four localities and both sexes foraged on them. Both nesting females, one at each confirmed breeding locality, repeatedly brought grasshoppers to their nestlings (n=14). Once, on 10 June at the Dean property, while the female was repeatedly feeding young, the nesting male apparently brought food to the nestlings, an unusual behavior (Zimmerman, 1966).

Associated Species - Associated probable, presumed, or confirmed breeding species within the territories of the four pairs at the two confirmed breeding localities were Northern Bobwhite (*Colinus virginianus*), Blue Grosbeak (*Guiraca caerulea*), and Field Sparrow. In addition, numerous Red-winged Blackbirds and several Eastern Meadowlarks (*Sturnella magna*) were at the Wallace property only. Orchard Orioles (*Icterus spurius*) frequently visited both localities. These above species were usually found on territories of all four unmated male Dickcissels at all four localities. Breeding Grasshopper Sparrows (*Ammodramus savannarum*) were found in the grassier habitats at all four localities. Common Yellowthroat (*Geothlypis trichas*) also nested on the territory of the unmated male at the Dean property. Seven species characteristic of shrubby hedges and pastures also nested on the territory of the unmated male near the Bethel Church.

1989 Breeding Status - In 1989, Dickcissels occurred at both locations where breeding was confirmed in 1988. At the Dean property, one unmated male sang frequently from 21 May to 1 July (not detected thereafter) on a very large territory, with frequent territorial shifts, within habitats used by all three males in 1988. This male's song matched the song of the unsuccessful paired male of 1988 at this location, and of no other Marlboro County male in 1988 (recordings archived at FMNH).

At the Wallace property, one male was usually present 14 May to 18 July (the date of my last visit). This male's song was appreciably different from the song type of all three males at this location in 1988. This male's song did not match that of any other male present in 1988. Thus, I presume that this male in 1989 was a different individual. This male had a very large territory with frequent territorial shifts, within the habitats used by all three males in 1988. On 1 June 1989 the male intruded on the Dean property, 2.5 km away, and engaged in a countersinging bout with the other male. By 9-11 June, the intruding male was back on territory at the Wallace property, still unmated. On the date of my next

visit, 21 June, the male was paired. Its territory was centered in dense *Lespedeza* favored by the paired birds of 1988. The female was apparently incubating on 1 July, but I failed to locate her thereafter, nor could I find any further evidence of nesting activity, and I believe the nesting attempt failed. Significant was the fact that the female was known to be absent from this breeding location for at least 29 days (14 May-11 June). The male benefitted by returning to his original location at the Wallace property to pair with this female.

Habitat at both locations was considerably more shrubby in 1989 than in 1988. The major change in avian species abundance was the increase of breeding Red-winged Blackbirds at both locations.

Previous Breeding Record - In 1984, I found Dickcissels 6 km S of St. Matthews, Calhoun County, S. C., near the junction of SC Route 6 and SR S-44 (Chat 49:26, 1985). This location was also in the Upper Coastal Plain. From 9 May to 6 June, I had six adult males and four adult females on territory in a roughly rectangular 4 ha wheat field covered with Kudzu (*Pueraria lobata*), approximately five years old. All females were accompanied by males. All birds were seen feeding on Grasshoppers. The only interspecific encounter I saw was the chasing of an intruding female Blue Grosbeak by two female Dickcissels in succession on 6 June. The only other species probably or presumably breeding within the Dickcissel habitat were Northern Bobwhites and Red-winged Blackbirds. Indigo Buntings (*Passerina cyanea*) visited the area occasionally.

Concluding Comments - My observations on the breeding behavior of both male and female Dickcissels agree with the literature (Long et al., 1965; Zimmerman, 1966; Gross, 1968; Schartz and Zimmerman, 1971; Patterson, 1984; Fretwell, 1986).

Acknowledgments - I thank J. W. Hardy for archiving my recordings of Dickcissel vocalizations at the Bioacoustics Laboratory, Florida Museum of Natural History. I thank D. M. Forsythe and H. T. Hendrickson for reviewing this paper. A sight record in "Briefs for the Files" of The Chat, compiled by H. E. LeGrand, Jr., is not listed in the Literature Cited section.

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