

LARK SPARROWS BREED IN RICHMOND COUNTY, N.C.

DOUGLAS BRANCH McNAIR

Abstract.—Lark Sparrows fledged young from one nest in late May 1981 near Derby, Richmond County, for the first modern North Carolina breeding record. This represents extralimital breeding approximately 500 km from the nearest presently known nesting localities. The successful nest and all but one of the incomplete nests were built on the ground under unappressed tufts of needles or boughs of seedling Longleaf Pines in a field planted with these pines; this field had bare sandy areas and low herbaceous plants. The total population of Lark Sparrows was three to four pairs, and the most frequently observed activity was singing by males. Courtship, nest construction, and fledging of young were seen. The possible origin of this population in the North Carolina Sandhills and its future prospects are discussed.

Lark Sparrows (*Chondestes grammacus*) are rare to uncommon and erratic breeding birds in the most easterly portions of their range (Todd 1940, Mengel 1965, Lerner 1979, Bierly 1980, and Peterson 1980), and a general decrease has recently occurred in many states (Peterson 1980 and many reports in *American Birds*). They have nested as close to North Carolina as northwestern Virginia (Lerner 1979), eastern Tennessee (Bierly 1980), and in the western parts of the Tennessee Valley and the Black Belt of Alabama (Imhof 1976). The species apparently no longer breeds in the northeastern-most portion of its breeding range (Peterson 1980), and the last known pairs nested in Virginia and eastern Tennessee in 1949 and 1972 (Lerner 1979, Hall 1972).

There is but one previous breeding record for North Carolina. The A.O.U. *Checklist* (1957) and Baepfer (1968) state the Lark Sparrow breeds in western and central North Carolina (Cranberry, rarely to Raleigh), which is decidedly misleading. I have been unable to find a published record of Lark Sparrows breeding at Cranberry, which is in central Avery County. *Birds of North Carolina* (Pearson et al. 1942) lists but one breeding record, that of a deserted nest with four eggs found by H. H. Brimley at Raleigh on 24 July 1890. Thus a recent nesting record from the North Carolina Sandhills is especially noteworthy. Three to four pairs were present near Derby, Richmond County, and one pair fledged young in late May of 1981.

METHODS

Information obtained represents data gathered over 17 hours from late May to early July. Behavioral activities were timed by a digital watch and stopwatch. All birds were unmarked. They were sexed and aged by behavior or plumage.

HABITAT DESCRIPTIONS

I discovered Lark Sparrows the latter half of May 1981 at two localities near Derby, Richmond County, N.C. The first site is an abandoned 5.6-ha pasture 5 km SE of Derby on SR 1003 (Derby Road). Pineweed (*Hypericum genianoides*), Wireweed (*Stipulicida setacea*), and *Polyprenum procumbens* are the most numerous herbaceous plants. There are scattered clumps of *Haplopappus divaricatus*, Lovegrass (*Eragrostis* sp.), and Plaintain (*Plantago* sp.). Lupine (*Lupinus diffusus*) is a locally important prominent species. Small (2 to 4 m) Longleaf Pines (*Pinus palustris*) and Broomsedge (*Andropogon* sp.) are in a corner of the pasture. A small garden is also present. Other representative plant species are Rabbit Tobacco (*Gnaphalium obtusifolium*), Thistle (*Carduus repandus*), *Eupatorium capillifolium*, and *Panicum* sp. The pasture is a minimum of 3 years old, with pines that are 12 to 14 years old in one section. There are



Fig. 1. Lark Sparrows bred successfully in this field of young pines near Derby, Richmond County, N.C., in 1981. The Longleaf Pines shown above range in height from 25 to 50 cm. (Photo by Tom Howard)

many bare sandy areas. The pasture is almost encircled by a sandy road and is bordered by Derby Road, two homes, a windbreak row of 12-m Loblolly Pines (*P. taeda*), second-growth pine-oak forest, a young-pine pasture, and hay, grain, and vegetable fields.

The second locality is an 8-ha barren field planted in rows with short (20 cm to 1.15 m) Longleaf Pines (Fig. 1) 1 km closer to Derby than the pasture, and also on the Derby Road. *P. procumbens*, *Heterotheca subaxillaris*, and *H. divaricatus* are the most numerous herbaceous plants, and Rabbit Tobacco is fairly common. The field is 5 to 8 years old, and sandy barren areas are characteristic. There is a slope with a difference of 1.5 m in relief. Adjacent areas are a 11- to 13-m Longleaf Pine woodlot, oak shrub 2.5 to 6.1 m high, a hedge bordering a hay field, scattered deciduous saplings, and Derby Road separating the nesting site from a large field.

There is another barren field planted in rows with short Longleaf Pines on another side of the Longleaf Pine woodlot and oak shrub. This field is similar to the 8-ha field, but is lower and wetter than surrounding habitats. Dwarf Morning Glory (*Bonamia patens*) is widespread and Lupine is locally abundant. Henceforth, this field shall be called the back field and the 8-ha field, the major field.

Key breeding species at one or both localities include the following. Bobwhite (*Colinus virginianus*) and Mourning Dove (*Zenaida macroura*) are numerous. An Eastern Meadowlark (*Sturnella magna*) nest was found in both the major field and pasture. Horned Lark (*Eremophila alpestris*) and Common Nighthawk (*Chrodeiles minor*) apparently nested in the field across the road from the major field. Loggerhead

Shrike (*Lanius ludovicianus*) nested in the area and fed at both sites. Field Sparrow (*Spizella pusilla*) and Blue Grosbeak (*Guiraca caerulea*) were important species of shrub and hedge.

POPULATION AND PERIOD OF OCCURRENCE

The total number of Lark Sparrows present was 11 or 12, 7 or 8 adults and 4 juveniles. One pair was seen in the pasture on 18 May, and the male was singing on 22 May; none were seen at the pasture subsequently. Three singing males were on territory in and near the major field from 22 May to early July. Two pairs were observed on several occasions, and 7 or 8 adults were seen on 3 June, foraging in one flock in the major field. This total probably included the pair from the pasture. Thus, at least three pairs, possibly four, were present near Derby. Known females were last seen on 19 June (J.M. Lynch, pers. comm.), accompanied by singing males. Three juveniles with adults were seen on this date, and a fourth juvenile was also present (see below). The successful nesting female's plumage was very worn by mid-June. Several adults had dispersed 3 to 5 km by early July, and no Lark Sparrows were seen afterwards.

PROOF OF BREEDING

On 22 May in the major field, I noticed an anxious male carrying a caterpillar. While searching nearby, I flushed a female off a nest with five young. The nestlings' eyes were wide open; the remiges were starting to emerge from their sheaths, and the rectrices were short. The nest was collected later and is North Carolina State Museum No. 8181.

Jay Carter and Tom Howard accompanied me to the site on 27 May, and we found an empty nest. Howard and I returned the next day and found the male parent bringing small grasshoppers to one very recently fledged bird in the pine woodlot. The juvenile was hiding under vegetation on the ground, and we flushed it. Howard photographed the young bird before I caught it. The juvenile was an undistinguished brownish color and deeply streaked on both under- and upperparts; the tail was but one-half the adult length, though already showing white on the outer rectrices (Fig. 2). Last seen on 23 June with the male in the pine woodlot and major field, the juvenile looked as depicted in popular field guides.

I concluded the juvenile fledged from the discovered nest. Nestling Lark Sparrows are able to leave the nest the sixth day after hatching and normally do so at 9 or 10 days of age, at which time they can fly (Baepler 1968). Baepler's description of juvenile plumage on the fifth day of the nestling period is most similar to the juveniles I discovered in the nest on 22 May. Thus the juvenile photographed on 27 May was probably 10 or 11 days old. It was observed flying as far as 5 m and as high as 2 m. This closely agrees with Baepler's statement that juveniles first fly at 9 to 10 days. Lark Sparrows begin incubation after the last egg is laid for normal early clutches, though incubation may begin with laying of the first or second egg on renesting attempts, according to Baepler. It is reasonable to assume this nest represents a normal clutch because of the early date. Assuming the juveniles were 5 days old when discovered, represent a clutch of five, and have an incubation period of 12 days, the first egg was laid on 3 May with a probable error of ± 2 days. No other active nests were discovered, and I believe this was the only successful nest in the area. Lynch visited this site on 19 June and found three juveniles begging food from adults. These are almost certainly three of the four other juveniles from the same nest.

NEST-SITE SELECTION AND NEST CONSTRUCTION

The complete nest (Fig. 3) was a depression in the sand, partly lined with grasses and stems of herbs and situated at the base of a seedling pine 25 cm high by 48 cm wide. The nest diameter was 11 cm and its depth was 6.5 cm; the unlined bottom was 6 cm in diameter. Facing east, the nest was on a 3° slope. The pine needles were not appressed to



Fig. 2. The juvenile Lark Sparrow shown above fledged from a nest in Richmond County, N.C., in late May 1981. Note the white on the tail feathers. (Photo by Tom Howard)

the ground and provided a canopy for the nest, which could be viewed without disturbing any vegetation. The immediate area surrounding the pine was bare.

Five incomplete nests, all in the major field, were discovered on days subsequent to 22 May. All five and the complete nest shared many characteristics. Each nest scrape was excavated at the base of a pine in sandy soil on a slope of 3° or less and faced an east to south direction. Nest scrapes ranged from 11 to 12.5 cm in diameter and 4 to 7.5 cm in depth. Only the successful nest was completed. Three other nests were incomplete, in varying stages of completion with construction begun on the side away from the pine; two had no lining. Nest lining consisted of grasses and stems of herbaceous plants. The nest scrapes varied from very fresh to old when discovered from 3 to 15 June. The height of pines chosen ranged from 25 to 50 cm with a mean of 39.8 cm and standard deviation of 12 cm. The spread of seedling pines ranged from 48 to 73 cm with a mean of 62.3 cm and standard deviation of 8.5 cm. A systematic analysis of the pines selected for nest sites with those not selected revealed what I intuitively expected: There were no significant differences in size. I also noted whether or not tufts of pine needles or boughs were appressed to the ground. All six pines chosen by Lark Sparrows were not appressed, which is significant. During 9 hours of searching for nests, I obtained no evidence, behavioral or otherwise, that Lark Sparrows attempted to nest outside the major field, though earlier discovery may have produced more illuminating results. I believe the evidence is clear. Lark Sparrows preferred seedling pines with unappressed tufts of needles or boughs for nest sites. Nest sites that provide cover are preferred by the Lark Sparrow throughout its range, particularly in the East where it nests on the ground



Fig. 3. The successful Lark Sparrow nest in Richmond County, N.C., was built in a scrape in sandy soil at the base of a young Longleaf Pine and partially lined with grasses and stems of herbaceous plants. The overhanging pine needles help shade and conceal the nest. (Photo by Tom Howard)

more frequently than it does in the West (Roberts 1936, Sutton 1967, Baepler 1968, Newman 1970, Walcheck 1970). This preference for cover is, in part, to protect the eggs and nestlings from becoming overheated. Walcheck found Lark Sparrows preferred nesting on the ground under Big Sagebrush (*Artemisia tridentata*) rather than under Greasewood (*Sarcobatus vermiculatus*). The height and width of the canopy of both species were similar as well as their frequency, but Big Sagebrush had many more overhanging branches and the soil was more granular underneath because the life form of the vegetation caught rainfall better and prevented the soil from becoming hardpanned as it did under Greasewood. Lark Sparrows seemingly have shown no especial preference for coniferous or deciduous growth in other areas, but partly select nest sites based on life form characteristics.

While watching a pair courting on 18 May, I found a partially lined nest at the base of a Lupine in the higher part of the pasture. The nest faced S-SW and the plant's stems and leaves provided a canopy. This was the only other incomplete nest discovered.

More critical than the vegetation, however, is the soil, which must be sandy or otherwise poor (Graber and Graber 1963, Baepler 1968 and others). The Derby locality satisfies this requirement as well as that of having sections of slightly elevated land within expanses of otherwise similar habitat—another preference Roberts noted in Lark Sparrow nest-site selection. The back field is lower (and wetter) than surrounding habitats and thus apparently unsuitable for nesting Lark Sparrows.

The six nests in the major field, except for being placed in the higher areas, seemed to be randomly distributed. It is possible that random distribution of nests in a homogenous habitat is the best defense against predation, as the nests themselves are poorly concealed. A snake was the probable agent in accounting for less than the complete brood fledging successfully, as the nest was undisturbed. Newman (1970) found nesting success lower in ground nests than in those above ground, and snakes were implicated as a major predator.

Both males and females help in nest-site selection, the males usually dropping stems at prospective sites and the female building the nest with these and ones she has also collected (Baepler 1968), but there is no information in the literature on how many scrapes may be excavated by one pair before one nest is completed. There were but two probable pairs, absolutely no more than three, at the major field where the six scrapes were excavated.

BREEDING BEHAVIOR

Courtship.—Courtship was observed only on 18 May in the barest area of the pasture, and all courtship activity occurred within 36 m of the incomplete nest except for flight to the nearby row of Loblolly Pines. The male gave the "Turkey-cock" display (Barlow 1960) on the ground before the female at 1830. For the next 45 minutes the male alternated bouts of singing with other activities such as presenting stems to the female, searching for suitable stems, and examining potential nest sites. Singing occupied about 80% of the time, and the normal song was delivered from many perches, both on the ground and above the ground. The male placed stems on the ground at several sites, usually Plantago and Lupine, including the site of the incomplete nest.

Song.—Singing was the dominant activity of male Lark Sparrows and was frequent at all daytime hours. It may have been frequent at night (Roberts 1936, Baepler 1968), but I did not visit then. Estimated duration of singing by an individual male ranged from 10 to 95% of time under observation, often timed continuously for 1 hour. The low of 10% was recorded for the male tending the juvenile on 28 May. There was no apparent correlation of singing time with weather.

The normal song usually consisted of one unbroken succession of 5 to 8 mellifluous trills, with some churring notes interspersed. Each song lasted an average of 3 seconds with a range of 2 to 5 seconds. I timed many periods between the beginning of one song and the beginning of the next; representative means of consecutive songs with no long pauses were 9.8 to 13.5 seconds. Once on 28 May, the male parent, while tending the juvenile, sang an extended song atop a 1-m pine in the major field. The same male also sang the normal song sotto voce in the major field on this occasion. Both are rare songs presumably maintained the male-female pair-bond during a time of stress, i.e. when both were responsible for the very recently fledged young. Other vocalizations heard were contact, alarm, distress, and feeding notes.

Lark Sparrows preferred singing from elevated perches in low plants in fields and in shrubs and pines. Ground singing was infrequent and mostly related to courtship. The flight-song was never observed. Baepler (1968) says this may be frequent whereas Roberts (1936) says it is rare. The relative frequency may be related to both species density and availability of elevated perches. The low density and many adequate perches at Derby may explain the lack of flight-song observations.

Lark Sparrows usually selected singing perches in the upper half of the crown and near the trunk or main axis of leafy trees or shrubs. Birds often sang at or near the top of bare shrubs. Males sang from many perches within their respective territories; however, each singing male had several favorite perches, and one had as many as eight. This is contrary to Baepler (1968) and Roberts (1936), who state that they do not have favorite perches. Some individual males showed a preference for a particular type of singing perch (i.e. dead oak shrub, toward top of large Longleaf Pine), but others showed no preference for one type.

Foraging.—All foraging occurred on the ground. Both male and female fed the young. Caterpillars (N = 2) were fed to nestlings; grasshoppers (N = 5) were fed to the juvenile. Other food items included seeds eaten by adults. Females pecked quicker and were warier than males; foraging females sometimes engaged in neck scanning and mouse runs. Todd (1940) noted similar female feeding behavior during the breeding season in Pennsylvania.

Other Behavior.—When flushed from fields or shrubs, Lark Sparrows, including singing birds, preferred to fly to nearby large pines at both localities. Birds flushed to large pines almost always landed in the upper half of the crown, and if flushed again, preferred to stay in pines. Lark Sparrows often entered large pines—when flushed, flying to singing perches, resting, or carrying food to the juvenile—by approaching at a height equal to the eventual chosen perch. Maintenance activities, preening and scratching, usually occurred between singing bouts during rest periods. Longest continual preening observed was 20 seconds.

POSSIBLE ORIGIN OF LOCAL BIRDS

The Derby nesting locality is 480 to 650 km from the nearest presently known breeding sites in Alabama, Tennessee, and Kentucky. Although the Lark Sparrow crossed the Allegheny Divide into the Northeastern States (Todd 1940), it has failed to advance from Alabama eastwards, which suggests the Northeast as the origin of the Derby birds. It is conjecture whether the birds found the Derby site when migrating during spring toward the Northeastern breeding grounds or if these birds wintered near Derby and decided to nest there instead of migrating. Lark Sparrows have been reported wintering sparingly on the coast of the Southeastern States (Baepler 1968, Potter et al. 1980), and are decidedly scarce inland. The last Lark Sparrow in Derby was seen in early July 1981 and despite intensive search since, none have been found. Whatever their origin, three to four pairs at one place in North Carolina is remarkable.

FUTURE PROSPECTS FOR LOCAL BREEDING POPULATION

Six incomplete nests and abandonment of the pasture by one pair suggest a lack of behavioral synchrony within breeding pairs of a species nesting at the very edge of its breeding range. Newman (1970) found 16.1% of Lark Sparrow nests abandoned for reasons not caused by predation—a much lower percentage than at the Derby site—but published no information on why or how this occurred. I could not determine how many pairs were responsible for the nest starts in the major field though a second pair was almost certainly involved. A very fresh scrape was found on 3 June, at which time the successful nesting pair was still feeding young, and certain second broods are unknown (Baepler 1968). The other singing male in the major field shifted most of its singing from the field to oak shrubs, which may have been a partial response to breeding failure.

Suitable habitat and life-form characteristics of the vegetation may be the most important factors for establishment of a stable breeding population. It is not surprising that the poor sandy soils of the North Carolina Sandhills were selected. Scattered tracts of similar habitat exist at the Fort Bragg Military Reservation (Jay Carter and Tom Howard, pers. comm.). Prospects at the present site are not good, however, because it is for sale. Nevertheless, Carter saw an adult at this site in May 1980, and Lark Sparrows were probably breeding that year. This suggests that the population may be trying to establish itself. However, Lark Sparrows have declined or retreated from breeding areas nearest the Carolinas, which provides scant hope the Derby population will persevere. Nevertheless, given the scarce coverage of potential Lark Sparrow habitats in the Carolinas and the especially favorable environment of the Carolina Sandhills, the presence of three or four pairs in 1981 at Derby provides some hope that this species may become a rare but regular breeder in the Carolinas.

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Department of Zoology, Clemson University, Clemson, S.C. 29631, 28 October 1981.