

## CHANGES IN THE BREEDING RANGES OF TWO GRASSLAND BIRDS

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DURING the past 170 years, the Dickcissel (*Spiza americana*) and the prairie race of the Horned Lark (*Eremophila alpestris praticola*) have changed their breeding ranges. Since 1800, the lark's range expanded while the Dickcissel's range first expanded, then receded. This paper demonstrates that these changes can be attributed to man-made environmental changes. Data on bird distribution, vegetational history, and agricultural practices were gathered from libraries, museums, and from the annual breeding bird surveys conducted by the United States Fish and Wildlife Service since 1967.

Range diagrams based on historical accounts encompass all locations of confirmed breeding activity for the years involved. Range maps based on the breeding bird surveys encompass all 25-mile survey routes with a 6-year mean of at least two birds sighted for the years 1967 through 1972.

### RESULTS

*Horned Lark.*—The prairie race of the Horned Lark nests in short grass or barren areas early in the year when such conditions are available (Pickwell 1931). Prior to the settlement of North America, it bred on the tall-grass prairies of Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, the Dakotas, and Manitoba (Pickwell 1931) (Fig. 1). Starting in the early 1860's, the breeding range expanded eastward, spreading rapidly through Michigan and Ontario in the 1870's (Fleming 1907), and reaching the Adirondack Mountains in New York by 1880 (Merriam 1881). The subspecies occupied the Hudson River valley and was on Long Island, New York in 1886 (Dutcher 1888); it spread into Vermont, Massachusetts, and Connecticut by 1891 (Sage et al. 1913). The lark moved into the Allegheny Mountains in southwestern Pennsylvania, northern West Virginia, and western Maryland between 1900 and 1910 (Brooks 1952), and spread through Pennsylvania and to the Atlantic coast of Maryland by 1946 (Stewart and Robbins 1958).

The lark's breeding range also extended southward from the prairies. Nesting in Kentucky began in 1909 (Howell 1910), although the bird probably was a winter visitor there a century earlier (Imlay 1797). The lark population in the Ozark plateau increased in the early 1900's and a southward expansion through Oklahoma began in the 1920's

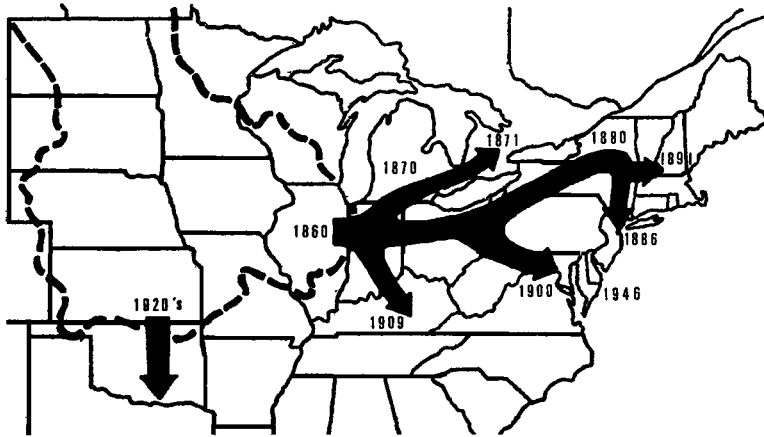


Fig. 1. Probable breeding range of the Prairie Horned Lark prior to colonization of North America. Arrows show range expansion of the Prairie Horned Lark, 1860-1946.

(Nice 1931). Other minor range alterations, including a decline in the New England population in recent decades, occurred before the lark reached its 1972 range as depicted in Fig. 2.

*Dickcissel*.—The Dickcissel is also a grassland bird but nests somewhat later than the Horned Lark and only in habitats of tall grass, forbs, or dense shrubs (Gross 1968). Based on its present nesting habitat, the breeding range before colonization of North America was probably confined to the tall-grass prairie lands of the central section of the continent, similar to the range of the Horned Lark but extending farther south through Texas to the marshy tall-grass regions of the gulf coast (Audubon 1838) and not extending as far west into the mixed-grass prairies. After 1800 Dickcissel breeding was recorded on the east coast, and by 1838 it bred commonly from Cape Cod to the District of Columbia, nesting in coastal marshes or agricultural lands (Wilson 1831, Audubon 1838, Stone 1913).

Dickcissels bred regularly in the Atlantic coastal states until 1850 (Fig. 3), but then populations declined. They were common on Long Island, New York until 1844 (Dutcher 1889). In the Connecticut valley, where nesting had been common through the 1840's, Dickcissel numbers steadily dropped from 1850 to 1866 (Bagg 1923). The Dickcissel was common on Cape Cod in 1855 (Cruickshank 1964), but breeding declined there in the next 30 years (Miller 1890). New Jersey and eastern Pennsylvania lost their breeding Dickcissel populations by 1879 (Miller 1904).

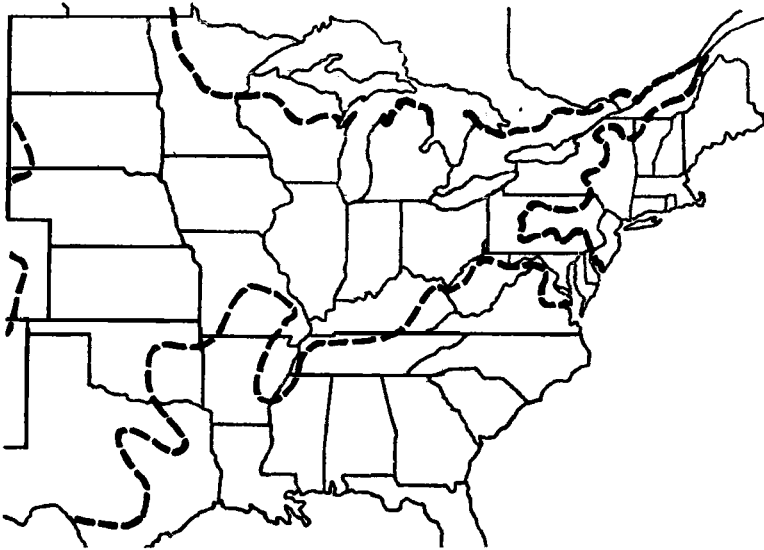


Fig. 2. 1972 breeding distribution of the Prairie Horned Lark (compiled from the breeding bird surveys, 1967-72).

Dickcissels were considered extremely rare in Washington, D.C. by 1875 (Richmond 1888).

By 1900 the Dickcissel had disappeared from the eastern segment of its breeding range, and its breeding population in the East never again reached the high levels realized in the 19th century. Its breeding range in 1900 was similar to its probable ancestral range with the exception of midwestern changes described below.

While the Dickcissel occupied the east coast, its major range in the prairie states gradually expanded. Between 1869 and 1879, the species spread eastward to eastern Indiana and became common in southern Michigan (Gibbs 1879, Butler 1898). The few Ohio and Kentucky records that exist from the late 19th century indicate that the Dickcissel increased in Ohio between the early 1870's and the late 1890's, and became "very common" in the grasslands of western Kentucky by 1885 (Saunders 1885, Jones 1895, Mengel 1965). Some eastward extension of the breeding range across Tennessee's Cumberland plateau is revealed by the breeding bird surveys for the years 1967 through 1972 (Fig. 4).

#### DISCUSSION

*Settlement and deforestation.*—After the 1820 Land Law was enacted, initial settlement was concentrated in the forested parts of the Midwest,

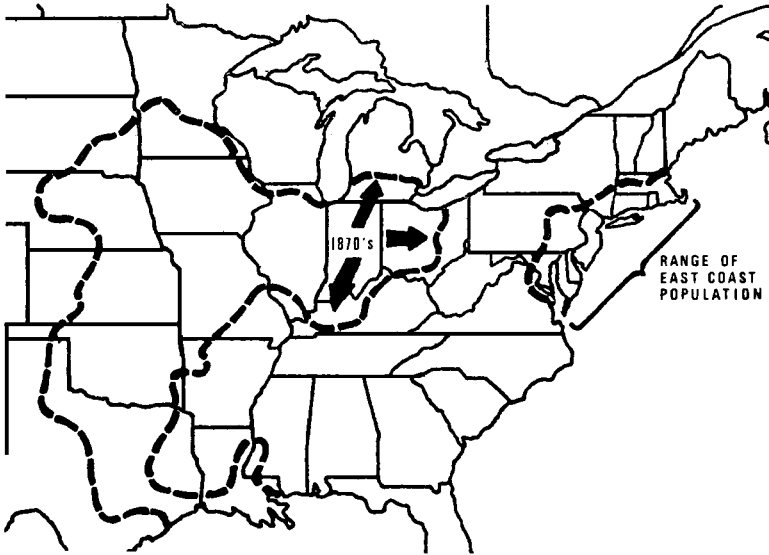


Fig. 3. Breeding distribution of the Dickcissel, 1800–1900, showing range expansion in the 1870's and the range of the east coast population.

resulting in rapid clearing of the stream bottomlands and some of the wooded uplands. Much of the original forest was destroyed to provide building materials and cropland. By 1830 the fertility of the prairie was discovered and rapid settlement of the grasslands began. Most of the prairie land of Indiana, Michigan, Illinois, Wisconsin, Iowa, and Missouri was homesteaded by 1840, resulting in eventual tillage of the prairies (Weaver 1954).

The fields produced by agriculture created vast artificial "barrens" that were good nesting habitat for the Horned Lark, formerly restricted to early nesting when the prairie grasses were still short. Similarly, hay and grain crops and the field-edge brushy growth provided nesting habitat for the Dickcissel.

Lumbering operations in lower Michigan began in the mid-19th century and reached a high level in the 1870's when the pine forest and much of the beech-maple forest was removed and the resulting bare lands were burned repeatedly (Kendeigh 1948). This created more habitat of scattered weeds, grasses and shrubs, suitable to both the Horned Lark and the Dickcissel. The spread of the prairie race of the Horned Lark into Michigan and Ontario in the 1860's and 1870's parallels the eastward and northward extension of the Dickcissel's range in the same region; both range expansions followed woodland clearing.

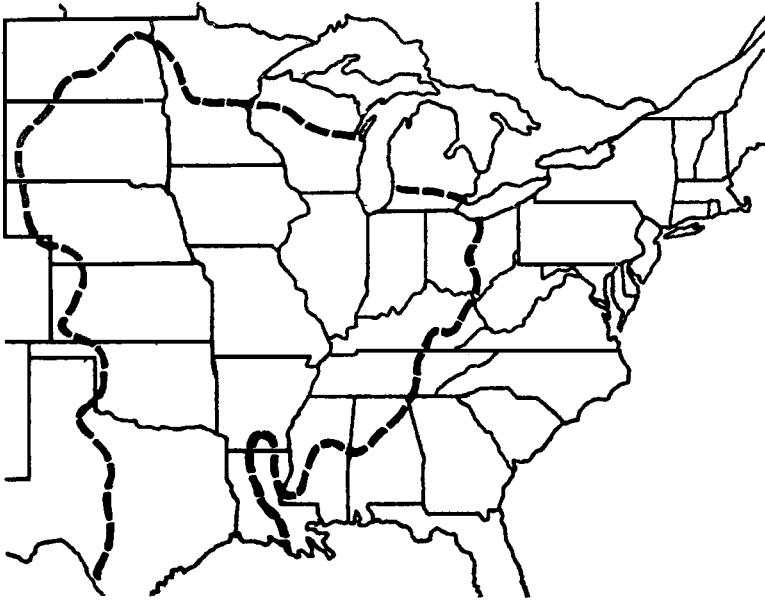


Fig. 4. 1972 breeding distribution of the Dickcissel (compiled from the breeding bird surveys, 1967-72).

In New England forests were cleared for agriculture until the amount of cleared land reached about 80% of New England's total land area between 1820 and 1850 (Bromley 1935). Although much of this later reverted to second-growth forest, the Horned Lark's movement across New York state and into New England in the late 19th century may have been in response to the removal of forests.

In the early 20th century, the Horned Lark penetrated West Virginia and moved through Maryland to the Atlantic coast, possibly following deforestation. The lark found little to impede its progress along the Great Lakes and in the less elevated portions of the northern Allegheny Mountains, but probably could not have moved east from the open areas of the Ohio valley until the heavily forested slopes of the higher Alleghenies were at least partially cleared. Intense lumbering in the region between 1910 and 1925 removed this barrier and the lark slowly moved eastward in suitable habitat (Brooks 1952). In the eastern states today, the lark nests in such artificial barrens as fields, pastures, and lawns.

*Further influences on the Dickcissel.*—If the southern Allegheny forests were not removed until the early 20th century, how did the Dickcissel

colonize the east coast in the early to mid-19th century? The answer may lie in its migratory behavior. Unlike the prairie race of the Horned Lark, which winters primarily in the central and southern United States, the Dickcissel spends the winter months in Central and South America. In the spring migration, most Dickcissels fly along Central America and follow the Mississippi valley north to the prairies (Gross 1956). A few Dickcissels either make a trans-Gulf flight to Florida (indicated by April reports there, Gross 1956) and then move northward, or else move east from Texas to the east coast. Rare Dickcissel migration north along the coastal plain of South Carolina was mentioned by Audubon (1838). The fact that migrating Dickcissels occasionally used the Atlantic coastal plain may have been a factor in the early establishment of the species in the East when nesting habitat became available.

Transeau (1935) pointed out that some prairie grasses migrated to the east coast by way of the New York lowlands and became established in prehistoric times in various parts of the Middle Atlantic states. Such habitats, together with the grassy marshes of the east coast, could have provided nesting grounds for the Dickcissel (as indicated by Griscom 1923), but despite the early presence of such potential nesting sites on the east coast, the Dickcissel apparently did not nest there until the development of agricultural hayfields.

The Dickcissel is frequently associated with fields of timothy (*Phleum pratense*), alfalfa (*Medicago sativa*), and clover (*Trifolium* sp.). Timothy was introduced to North America in the mid-18th century and by 1807 was the most important hay grass in the United States, especially along the east coast (Archer and Bunch 1953). Many of the clovers were introduced to the United States in the 18th and early 19th centuries (Myers 1967). The extensive growth of these hay plants in the East may have helped the establishment of a Dickcissel population along the mid- and northern Atlantic coast in the 19th century.

Alfalfa, introduced from Mexico in the early 19th century, spread from the Southwest and became an important forage crop as far east as Kansas by 1869 and Ohio by 1886 (Bolton 1962). This was about the same time that the Dickcissel became a regular breeder in Indiana and Ohio. It is likely that alfalfa is well-suited to the needs of the Dickcissel and has partially replaced the tall-grass prairies as principal nesting habitat.

Although the introduction of alfalfa in the East may have attracted Dickcissels, alfalfa harvesting practices proved detrimental to the species. Dickcissels for the most part breed from May to July, the same season in which alfalfa is harvested, and a significant number of nests fall victim to the mowing machine (Gross 1968). In the East, where the

breeding Dickcissel populations had been local in nature since the early 19th century and where Dickcissels were most commonly found in and around alfalfa hayfields (Stewart and Robbins 1958), such harvesting practices could have had adverse effects on the species.

Spreading urbanization may also have been a factor in the decline of the eastern Dickcissel population after 1850. Many of the locations from which Dickcissels were once reported disappeared as cities sprawled over them (e.g. suburbs of Boston, Philadelphia, New York City, the District of Columbia). The New York City breeding population was practically eradicated after extensive draining of coastal marshes and clearing of land for real estate development by 1885 (Griscom 1923). The resulting lawns and other open and short-grass areas of the spreading suburbs, while favorable for Horned Larks, were poor for Dickcissels.

#### SUMMARY

Since 1800 the breeding ranges of the Dickcissel and the prairie race of the Horned Lark have changed as a result of lumbering, unbanization, and agricultural practices. The breeding range of the lark expanded from the tall-grass regions of the Midwest to the east coast of the Middle Atlantic states, apparently in response to deforestation and the creation of artificial "barrens" in the form of agricultural fields and lawns. The Dickcissel also benefitted from the deforestation when the resulting open spaces were occupied by dense shrubs or hayfields. The Dickcissel's range expanded in the Midwest and it bred from Cape Cod to the District of Columbia from about 1800 to 1850 probably as a result of the hay crops introduced to that region. After 1850 the east coast Dickcissel population declined, probably because of the destruction of nesting habitat by hay harvesting and spreading urbanization.

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