7-1-1998

Range of the Brown-headed Cowbird in Colorado: past and present

Jameson F. Chace  
*University of Colorado, Boulder*

Alexander Cruz  
*University of Colorado, Boulder*

Follow this and additional works at: [https://scholarsarchive.byu.edu/gbn](https://scholarsarchive.byu.edu/gbn)

**Recommended Citation**  
Available at: [https://scholarsarchive.byu.edu/gbn/vol58/iss3/4](https://scholarsarchive.byu.edu/gbn/vol58/iss3/4)

This Article is brought to you for free and open access by the Western North American Naturalist Publications at BYU ScholarsArchive. It has been accepted for inclusion in Great Basin Naturalist by an authorized editor of BYU ScholarsArchive. For more information, please contact scholarsarchive@byu.edu, ellen_amatangelo@byu.edu.
RANGE OF THE BROWN-HEADED COWBIRD IN COLORADO: PAST AND PRESENT

Jameson F Chace and Alexander Cruz

Abstract.—The historic range of the bison (Bison bison) on the Great Plains has been well documented. In Colorado the range of bison included both the eastern grasslands and higher-elevation ridges and mountain parks, up to an elevation of 3900 m. Based on the commensal relationship of the brood-parasitic Brown-headed Cowbird (Molothrus ater) with the bison, we suggest that the cowbird had a larger historical elevational range in Colorado than previously known and consequently has had a long-term host-parasite relationship with high-elevation breeding songbirds.

Key words: Brown-headed Cowbird, Molothrus ater, bison, Bison bison, range expansion, Colorado.

The Brown-headed Cowbird (Molothrus ater) is a well-studied obligate brood parasite (Rothstein 1975, Friedmann et al. 1977, Rothstein 1990, Robinson et al. 1995, Cook et al. in press) that historically occupied a range similar to that of the bison (Bison bison; Friedmann 1929). Cowbirds ranged over the Great Plains in commensal association with bison; these “buffalo birds” are thought to have foraged among the grazed grasslands for insects stirred up by herd movements (Friedmann 1929, Mayfield 1965). They later expanded their range with the clearing of forests and introduction of domestic livestock (Mayfield 1965, Rothstein 1994). In Colorado, Brown-headed Cowbirds have undergone a recent elevational range expansion, possibly due to habitat alteration and cattle grazing in the high country (Hanka 1985), similar to cowbirds in the Sierra Nevada Range (Rothstein et al. 1980, Rothstein 1994).

The historical range of bison on the Great Plains is well documented (Allen 1877, Roe 1970). In addition, bison in the Rocky Mountains historically ranged above timberline in Montana, Wyoming, and Colorado (Fryxell 1926, 1928, Warren 1927, Beidleman 1955, Pattie and Verbeek 1967). Bison once ranged throughout most of Colorado west of the Great Plains and at all elevations (Armstrong 1972, Meaney and Van Vuren 1993). Furthermore, bison probably were relatively abundant throughout northwestern Colorado, South Park, Middle Park, North Park, and the Front Range (Armstrong 1972, Meaney and Van Vuren 1993). We suggest that because of their commensal relationship cowbirds also occurred at high elevations in Colorado until their range contracted with the extirpation of bison and that they have undergone an elevational range re-expansion with the introduction of domestic livestock.

Our purpose is to demonstrate that (1) the 1st observations of cowbirds in Colorado occurred during the time lapse between extirpation of bison from, and movement of cattle into, higher elevations, and (2) the number of high-elevation records of cowbirds increased as the number of cattle in the western counties increased. Implications of long-term host-parasite interactions in Colorado’s high-elevation region are discussed.

Methods

We reviewed records of cowbird parasitism (see Chace and Cruz 1996) and bison distribution and determined the timing and abundance of cattle introductions to the Colorado counties west of the Great Plains. We also reviewed Colorado agriculture statistics to obtain the number of cattle in each county per year from 1883 to 1985 (intermittent years missing). Colorado counties east and west of the Front Range were analyzed separately, with Front Range counties containing >40% grassland habitat designated as eastern (see Fig. 1 for delineation of counties). Cattle numbers were summed per year by eastern and western designation. Although
cattle are not the only livestock that attract cowbirds (Rothstein et al. 1980), they are by far the most numerous and probably are a good index of livestock numbers per county in general.

RESULTS

Meaney and Van Vuren (1993) recorded all known bison specimens in Colorado west of the Great Plains from which we calculated that of 116 bison specimens, 36.9% were collected above 2500 m (Table 1). Recent research on free-ranging bison has shown that bison have seasonal elevational movements through open ponderosa pine (Pinus ponderosa), pinon-juniper woodlands (P. monophylla and Juniperus scopulorum), and across subalpine forest–parkland habitat (Fuller 1962, Van Vuren 1983, Van Vuren and Bray 1986, Shaw and Carter 1990). Furthermore, based on specimens taken (Figgins 1933), some herds of bison wintered in the mountain parks and migrated into higher elevations through forested communities during the summer (Meaney and Van Vuren 1993). Extant free-ranging bison in forested montane habitat of the Henry Mountains of Utah have smaller group sizes (2–30 animals) and larger home ranges (52 km²) than bison of the Great Plains (Van Vuren 1983, Van Vuren and Bray 1986, Meaney and Van Vuren 1993). In Colorado, Benedict (1993 personal communication) speculates that bison were extirpated from the Estes Park area by 1859 primarily due to the effects of the harsh winter of 1843–44. That winter, in combination with market hunting, may have been the cause of bison decline in other parts of the state. The last known wild
Table 1. Elevational distribution of bison specimens in 22 Colorado counties west of the Great Plains (from Meaney and Van Vuren 1993).

<table>
<thead>
<tr>
<th>Elevation (m)</th>
<th>No. of specimens (N = 116)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3501+</td>
<td>13</td>
</tr>
<tr>
<td>3001-3500</td>
<td>21</td>
</tr>
<tr>
<td>2501-3000</td>
<td>32</td>
</tr>
<tr>
<td>2001-2500</td>
<td>36</td>
</tr>
<tr>
<td>1500-2000</td>
<td>14</td>
</tr>
</tbody>
</table>

Bison in Colorado were killed in 1897 in Park County (Cory 1912), although a few may have survived until 1904 (Warren 1906). Bison numbers were very low by 1883 when cattle were fairly abundant east of the Continental Divide in Colorado (268,585 head), with considerably fewer in the western counties (56,782 head; Colorado Department of Agriculture, Colorado Agriculture Statistics, 1883–1985). Nearly equal numbers of cattle occurred in eastern and western counties through the 1920s (Fig. 2). Western counties reached their present levels of cattle population by 1959, with a peak in 1974 (829,300 head; Fig. 2). From 1941 the number of cattle in eastern counties consistently was double the number west of the plains, with a peak in 1973 of 2,978,800 head (Fig. 2).

Records of cowbird parasitism or presence rarely mention exact elevational localities. Early naturalists in Colorado surveyed high elevations and found cowbirds primarily occurring in grasslands and foothills below 2500 m (Henshaw 1875, Drew 1885, Gale 1893, Cooke 1897, Sclater 1912). More recently, cowbirds have been noted at higher elevations. Keeler-Wolf et al. (1972) reported parasitism of a Yellow Warbler (Dendroica petechia) nest in Gunnison County (2895 m). Cowbirds were common in mountain parks and river valleys in 1977 and 1978, with observations up to 2890 m in Park, Lake, Jackson, and Larimer counties (Hanka 1985). From 1986 to 1989, 164 Brown-headed Cowbirds were trapped and banded at a feeding station on Mt. Evans (elevation 3260 m). Cowbirds were trapped from April to August, with highest numbers in May (mean = 29.0); males outnumbered females 2.35:1 (Lorraine E. Reiner unpublished data). Hanka (1985) reported parasitism of Brewer’s Blackbirds (Euphagus cyanocephalus) at 2895 m in north central Colorado. Spencer (1985) reported an adult Wilson’s Warbler (Wilsonia pusilla) feeding a young cowbird at 3180 m. Wilson’s Warblers were also reportedly parasitized in Boulder, Clear Creek, and Summit counties (Ellisabeth Ammon unpublished data). In 1993–94 cowbirds parasitized Warbling Vireo (Vireo gilvus) nests ca 3000 m in Boulder County (Chace unpublished data). Recently, a number of high-elevation records of parasitism have been reported in the Colorado Breeding Bird Atlas project (Table 2; Colorado Breeding Bird Atlas unpublished data).

**DISCUSSION**

In Colorado, cowbirds probably had a historical, geographical, temporal, and elevational distribution similar to that of the bison, with an upper elevational limit ca 3800 m. Bison probably were numerous enough in the mountains to support commensal flocks of cowbirds during the avian breeding season. As the bison approached extirpation in the mid-1800s, herds were small and scattered, and cowbirds would have been mostly restricted to lower elevations where cattle were just beginning to show appreciable numbers in Colorado (Fig. 1). Cowbirds likely became associated with cattle in eastern Colorado and began to re-expand their range following the growing cattle herds to the west. By the turn of the century, naturalists began to record avian distributions in Colorado. Even though higher elevations were surveyed (Drew 1885, Sclater 1912), cowbirds were found primarily from grasslands to foothills and mountain ranges.
Table 2. Records of cowbird parasitism from western high-elevation counties from the Colorado Breeding Bird Atlas (1987-1994).

<table>
<thead>
<tr>
<th>Species</th>
<th>Years</th>
<th>Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willow Flycatcher (Empidonax traillii)</td>
<td>1987, 1991</td>
<td>Jackson, Teller</td>
</tr>
<tr>
<td>Dusky Flycatcher (Empidonax oberholseri)</td>
<td>1994, 1995</td>
<td>Jackson, Eagle</td>
</tr>
<tr>
<td>Cordilleran Flycatcher (Empidonax difficilis)</td>
<td>1991, 1995</td>
<td>Teller</td>
</tr>
<tr>
<td>Hermit Thrush (Catharus guttatus)</td>
<td>1990, 1994</td>
<td>Park, Mineral</td>
</tr>
<tr>
<td>Virginia’s Warbler (Vermivora virginiae)</td>
<td>1994</td>
<td>Teller</td>
</tr>
<tr>
<td>Yellow Warbler (Dendroica petechia)</td>
<td>1987, 1993, 1994</td>
<td>Grand, Gunnison, Jackson</td>
</tr>
<tr>
<td>Yellow-rumped Warbler (Dendroica coronata)</td>
<td>1991</td>
<td>Routt</td>
</tr>
<tr>
<td>MacGillivray’s Warbler (Oporornis tolmiei)</td>
<td>1994</td>
<td>Gunnison</td>
</tr>
<tr>
<td>Wilson’s Warbler (Wilsonia pusilla)</td>
<td>1988</td>
<td>Summit</td>
</tr>
<tr>
<td>Green-tailed Towhee (Pipilo chlorurus)</td>
<td>1991, 1993</td>
<td>Routt, Montrose</td>
</tr>
<tr>
<td>Fox Sparrow (Passerella iliaca)</td>
<td>1993, 1994</td>
<td>Eagle, Grand, Summit</td>
</tr>
<tr>
<td>Song Sparrow (Melospiza melodia)</td>
<td>1995</td>
<td>Teller</td>
</tr>
<tr>
<td>Lincoln Sparrow (Melospiza lincolni)</td>
<td>1994</td>
<td>Park</td>
</tr>
<tr>
<td>Brewer’s Blackbird (Euphagus cyanocephalus)</td>
<td>1991</td>
<td>Gunnison</td>
</tr>
</tbody>
</table>

In Colorado the center of bison abundance was the eastern grasslands. Although bison have been recorded in high montane areas in central and northwestern Colorado, records are conspicuously absent from the southwestern corner of the state (Meaney and Van Vuren 1993). Cowbirds are known from the eastern portion of the state, but little is known about their distribution in the west prior to the bison extirpation. They probably were located along the major tributaries to the Colorado River (Rothstein 1994) and were associated with western bison herds. Following cattle introductions, western populations of cowbirds may also have re-expanded their elevational distribution; however, a distributional change has not been well documented. In all probability the elevational range re-expansion was bimodal, but more pronounced along the eastern edge of the Rocky Mountains.

Prior to the extirpation of bison in the mid-1800s, Brown-headed Cowbirds undoubtedly bred and parasitized the nests of many songbird species in high-elevation regions of Colorado. It is likely that cowbird numbers at higher elevations declined as bison were extirpated and resurged following the introduction of cattle. However, now a different pattern of cowbird parasitism probably exists. When cowbirds followed nomadic bison herds, their parasitic efforts and eggs were dispersed over the range of seasonal movements of bison herds, whereas now cowbird breeding populations are as stationary as the herds of livestock around which they forage. Implications of this changing pattern on songbird communities are likely very important. Where once songbird communities may have encountered brood parasitism for only a portion of their breeding season, now the pressure of parasitism is pronounced throughout their reproductive effort. In addition, because of the strong site fidelity of many songbirds (Greenwood and Harvey 1982, Holmes and Sherry 1992), parasitism pressure may exist throughout the lifetime reproductive effort of many individual birds.

Acknowledgments

Initial concepts for this paper came through thoughtful discussions with Jim Benedict. We thank Lorraine E. Reiner and Elisabeth Ammon for sharing their unpublished data with us.
Comments made by C.P. Ortega, A.D. Benedict, J.B. Benedict, D.M. Armstrong, H. Kingery, C.A. Meaney, and 2 anonymous reviewers on earlier drafts are greatly appreciated.

LITERATURE CITED


Received 23 December 1996
Accepted 27 September 1997