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## Mind the gap: The Painted Bunting (*Passerina ciris*) breeds in central Alabama and eastern Mississippi

Neil A. Gilbert,<sup>1,4\*</sup> Howard E. Horne,<sup>2</sup> and John A. Trent<sup>3</sup>

**ABSTRACT**—Ornithologists have long been fascinated by an apparent disjunction in the breeding distribution of the Painted Bunting (*Passerina ciris*), with previous studies reporting a 550 km gap between a coastal population along the south Atlantic and an interior population in the south-central United States. However, these studies have overlooked breeders in the Black Belt Ecoregion of central Alabama and eastern Mississippi. Using data from our own fieldwork, the North American Breeding Bird Survey, eBird, and breeding bird atlas projects, we document that the Painted Bunting occurs within the gap described in previous publications. The presence of these birds raises further questions regarding the status of the Painted Bunting in the Southeast and may be relevant to future research and conservation efforts targeting this species. *Received 16 January 2018. Accepted 6 October 2018.*

**Key words:** Alabama, Black Belt, Mississippi, *Passerina ciris*, range.

### Un vacío no tan vacío: el colorín *Passerina ciris* anida en el centro de Alabama y el este de Mississippi

**RESUMEN**—Los ornitólogos han estado fascinados por mucho tiempo por la aparente distribución reproductiva disjunta del colorín *Passerina ciris*, con estudios previos que reportan un vacío de 550 km entre la población costera a lo largo del Atlántico sur y la población del interior en la parte sur-central de los Estados Unidos. Sin embargo, estos estudios han ignorado aquellos que anidan en la ecoregión Black Belt del centro de Alabama y el este de Mississippi. Utilizando datos de nuestro propio trabajo de campo, el censo de aves reproductivas Breeding Bird Survey de Norteamérica, eBird y proyectos de atlas de aves reproductivas, documentamos que *P. ciris* se encuentra en el vacío que se describe en publicaciones previas. La presencia de estas aves provoca más interrogantes acerca del estatus de *P. ciris* en el sureste y podría ser relevante para futuras investigaciones y esfuerzos de conservación enfocados en esta especie.

**Palabras clave:** Black Belt, rango de distribución

The Painted Bunting (*Passerina ciris*) is a colorful and charismatic passerine that breeds in the southeastern and central United States. Traditionally, ornithologists have considered it to have a disjunct breeding distribution, with a coastal population breeding along the south Atlantic and an interior population breeding in the south-central United States (Lowther et al. 2015). This apparent disjunct distribution has attracted research attention for decades (Storer 1951, Thompson 1991a, Contina et al. 2013). Early work described 2 subspecies based on morphological variation (e.g., color and wing length); however, the variation is clinal and does not correspond with the gap in distribution (Thompson 1991a, Lowther et al. 2015). Additionally, the purported subspecies are incongruent with recent phylogenetic data, which suggest the existence of 2 allopatric populations (Herr et al. 2011). Moreover, these populations exhibit different molt-migration strategies (Contina et al. 2013, Bridge et al. 2016). Interior birds migrate to molting areas in Arizona and northern Mexico before continuing to wintering grounds in western Mexico and Central America, while coastal birds molt on their breeding grounds and winter primarily in Florida and the Caribbean (Thompson 1991b, Sykes et al. 2007, Contina et al. 2013). This migratory divide is thought to keep interior and coastal populations allopatric throughout the annual cycle (Herr et al. 2011, Linck et al. 2016, Battey et al. 2018).

The literature describes the gap separating populations as a 550 km stretch from central Mississippi to eastern Georgia (Sykes and Holzman 2005, Herr et al. 2011). Niche modeling efforts by Shipley et al. (2013) suggested bioclimatic suitability within the gap, but, assuming bunting absence within the gap, the authors hypothesized that the gap's persistence is driven by fitness costs associated with circum- or trans-Gulf migration. However, Painted Buntings do breed within this gap, an oversight that we argue is

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caused by insufficient monitoring in the region. Here, we describe breeding-season observations of Painted Buntings within the gap, with records concentrated in the Black Belt Ecoregion of Alabama and Mississippi, and argue that future research and conservation efforts should account for their presence in these areas.

## Methods

### The Black Belt Ecoregion

The Black Belt (officially Blackland Prairie Level IV Ecoregion) is a crescent-shaped band stretching from Russell County, Alabama, to McNairy County, Tennessee, paralleling the margin of the Gulf Coastal Plain (Griffith et al. 2001, Peacock and Schauwecker 2003; Fig. 1). Prior to the arrival of Europeans, the Black Belt's limestone substrate, rich topsoil, and regular disturbance regimes maintained a prairie landscape (Peacock and Schauwecker 2003, Barone 2005). However, by the late 1800s, the native prairie had been almost entirely converted to agriculture, primarily tobacco, cotton, and corn (Brown 2003). Today, land use in the Black Belt is dominated by aquaculture, agriculture, and ranching.

### Data and mapping

We obtained Painted Bunting occurrence data from the following 4 sources: point counts, the Breeding Bird Survey (hereafter BBS), eBird, and breeding bird atlas (hereafter BBA) projects from Mississippi, Alabama, Georgia, and Florida. We will describe each in more detail below.

First, as a part of a broader study investigating habitat associations of grassland birds, we conducted point counts in the central portion of the Black Belt stretching from Noxubee County, Mississippi, to Dallas County, Alabama (Gilbert NA, Ferguson PFB forthcoming). We used a system of roadside point counts adapted from the BBS (USGS 1998). Point counts were located along low-traffic county roads and separated by intervals of at least 1 km. We conducted point counts at a total of 173 locations. We performed 15 min, double-observer point counts from 15 May to 5 July 2017 (Farnsworth et al. 2005). Surveys were conducted between civil twilight (i.e., 30 min

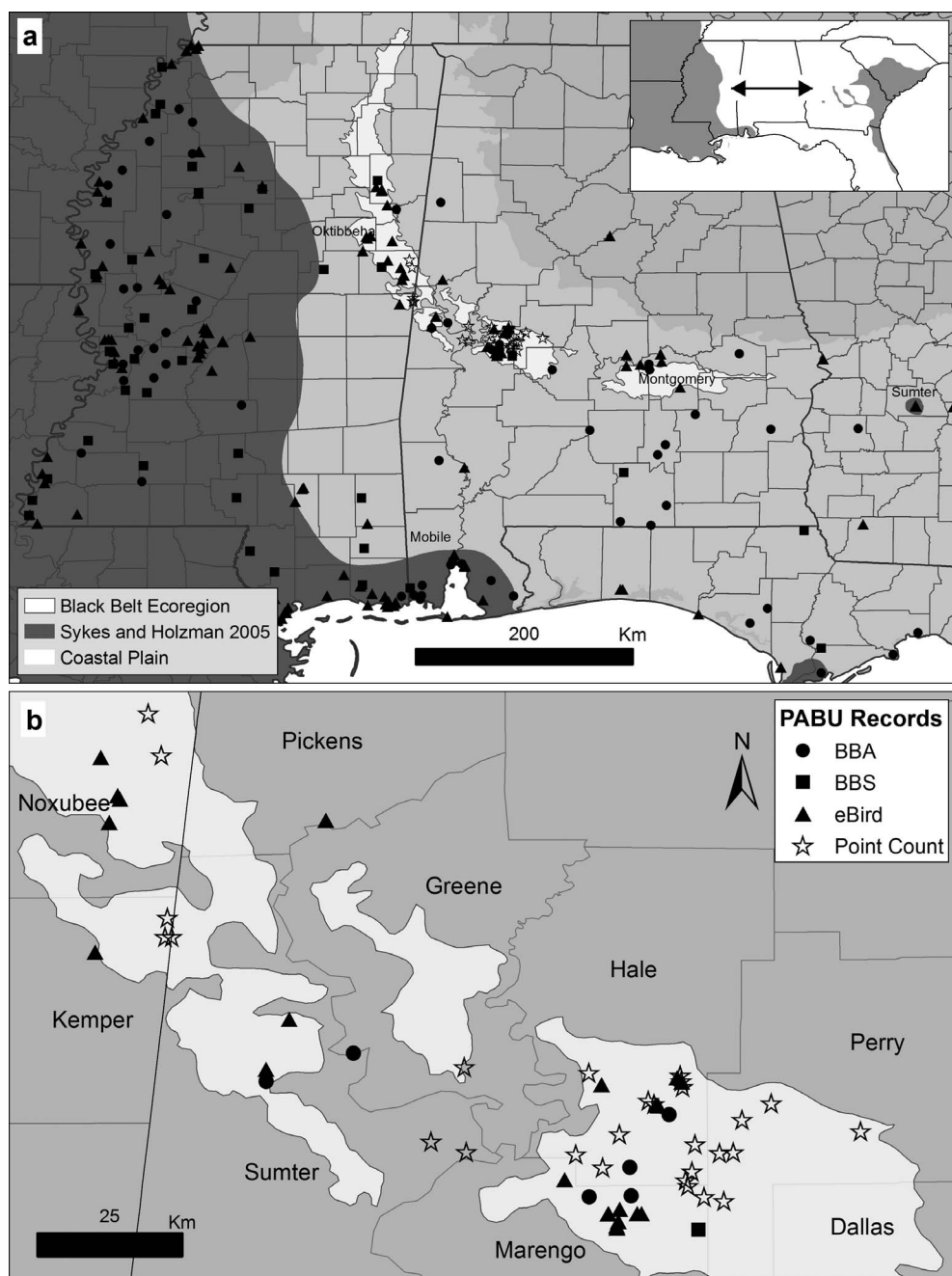
before sunrise) and 1000 h CDT (Ralph et al. 1995).

Second, we downloaded BBS data from 1966 to 2016 for Mississippi, Alabama, Georgia, and Florida (Pardieck et al. 2017). We used the total number of Painted Buntings recorded on each route and the coordinates of route starting points, since coordinates of each stop are not available. Third, we downloaded eBird data from all years from the 4 states (eBird 2017). We filtered the dataset to obtain observations only during 15 May–31 July and omitted checklists that covered a distance >10 km or that reported “X” instead of numeric counts. Fourth, we georeferenced occurrence data from the 1997–2004 Mississippi Breeding Bird Atlas (Goodman 2004), the 2000–2006 Alabama Breeding Bird Atlas (Haggerty 2006), the 1994–2001 Georgia Breeding Bird Atlas (Schneider et al. 2010), and the 1986–1991 Florida Breeding Bird Atlas (Kale et al. 1992). Finally, we mapped the occurrence data in ArcGIS 10.2 and overlaid it with a previously published range map that we georeferenced (Sykes and Holzman 2005).

## Results and discussion

In summer 2017, we recorded territorial male Painted Buntings at 28 locations (i.e., 16% of points surveyed) within our study area in the Black Belt of Alabama and Mississippi (Fig. 1). The majority of these were in Hale, Marengo, and Perry counties (Fig. 1). Additionally, we observed female Painted Buntings at 3 of these locations. With the addition of BBS, eBird, and BBA data, a number of other records appear within the gap, clearly showing a concentration of Painted Buntings within the Black Belt. Our efforts validate the work of Sykes and Holzman (2005: p. 14), who wrote, in reference to the Painted Bunting population in Sumter County, Georgia, “There are probably other such small groups as yet undiscovered within the gap between the two populations.”

We do not think that 2017 represents an unusual peak in Painted Bunting abundance in the region, even though populations tend to be more volatile at the margin versus the core of the range (Thomas et al. 2001, Parmesan 2006). Rather, we argue that the increase in Painted Bunting reports in the



**Figure 1.** (a) The Painted Bunting breeds in the Black Belt Ecoregion of central Alabama and eastern Mississippi, well within the gap shown by published range maps. We obtained the occurrence data from the following 4 sources: (1) point counts conducted during summer 2017 (*white stars*), (2) eBird records 15 May–31 July of all years (*black triangles*), (3) the North American Breeding Bird Survey from 1966 to 2016 (*black squares*), and (4) breeding bird atlas projects from Mississippi, Alabama, Georgia, and Florida (*black circles*). The range map from Sykes and Holzman (2005) is shown, and the inset (upper right) shows the map at broader extent to show the purported gap in distribution where our records are located. Panel (b) provides a zoomed-in view of Painted Bunting records in the central portion of the Black Belt where we conducted point counts in summer 2017.

Black Belt in 2017 and recent years is due to an expansion of concerted monitoring efforts as well as an increase in general awareness among birders about their presence in these areas.

Indeed, the presence of Painted Buntings within the gap is not a new phenomenon. In the Mississippi portion of the Black Belt, especially in Oktibbeha and adjacent counties, breeding season records for Painted Bunting date back to the late 1970s, and the area has received near-annual sightings since the late 1980s, including records of confirmed breeding (Turcotte and Watts 1999; TL Schiefer, Mississippi State University, 2014, pers. comm.). Alabama saw a dramatic increase in Painted Bunting reports in the Black Belt and Gulf Coastal Plain regions during the BBA project (Haggerty 2006), including observations of copulation and dependent young (Gardella and Reed 2002). In the time since that project, with the exception of a few regularly monitored sites in Montgomery County, little effort has gone toward finding Painted Buntings in the Alabama Black Belt, which is remote and seldom visited by birders and ornithologists during the breeding season. The data from our recent fieldwork represents the first notable increase in Painted Bunting sightings in Alabama at previously unknown locations since BBA efforts. Additional fieldwork by the Alabama Department of Conservation in summer 2018 confirmed breeding by Painted Buntings in Hale County, including recently fledged young and males with fully enlarged cloacal protuberances (JA Trent, ADCNR, 2018, pers. comm.).

In Alabama, although reports are concentrated in the Black Belt, Painted Buntings have been documented breeding in other portions of the Gulf Coastal Plain (Imhof 1976, Gardella and Reed 2002, Haggerty 2006). On the immediate Gulf Coast, a small concentration of records appears in Mobile County (Fig. 1), which is likely an artifact of higher coverage in this region. Painted Buntings have been documented breeding near Mobile Bay for many decades (Imhof 1976). These birds, along with breeding individuals on the Mississippi Gulf Coast (Turcotte and Watts 1999), have generally been attributed to interior populations (Sykes and Holzman 2005). However, the extralimital breeding season observations in southwestern Georgia and the Florida Panhandle raise

additional questions as to how these 2 populations interact along the northern Gulf Coast.

Scientists have identified a pattern of co-occurring east–west contact zones in Alabama for a number of taxa, including birds (Swenson and Howard 2005, Soltis et al. 2006, Soto-Centeno et al. 2013). For example, the 2 subspecies of the extinct Carolina Parakeet (*Conuropsis carolinensis*) are hypothesized to have overlapped in this region, showing a nearly disjunct distribution strikingly similar to that of the Painted Bunting (Burgio et al. 2017). Furthermore, the Carolina Chickadee (*Poecile carolinensis*) shows a phylogeographic break centered on the Tombigbee River in Alabama, and birds with the eastern and western haplotypes interbreed in western Alabama and eastern Mississippi (Gill et al. 1993, 1999). Given the identification of these phylogeographic breaks in Alabama (Swenson and Howard 2005, Soltis et al. 2006), we hypothesize that the previously-assumed-allopatric populations of Painted Buntings may overlap within the state’s boundary. The potential for genetically admixed birds is of particular interest given the differential migration strategies exhibited by the 2 populations (Contina et al. 2013, Bridge et al. 2016).

In conclusion, we document that the breeding range of the Painted Bunting extends into central Alabama, well within the gap of published range maps. Indeed, regularly reported breeders near Montgomery are within 200 km of breeders assigned to the coastal population in Sumter County, Georgia (Sykes and Holzman 2005). Given the placement of these birds between the interior and the declining coastal population, the Black Belt represents a possible link between the 2 populations and merits further research. To that end, we recommend additional fieldwork to search for breeding Painted Buntings in the eastern reaches of the Black Belt, as this ecoregion shows the greatest niche suitability within the gap (Shipley et al. 2013). Beyond the Black Belt, attention should also be given to the Florida Panhandle and areas of the Gulf Coastal Plain in Alabama and southwestern Georgia, as BBA data from both states indicates a scattered presence in these areas (Haggerty 2006, Schneider and Sykes 2010). Finally, we also recommend molecular work to determine the genetic relationships of Black Belt breeders to interior and coastal populations. These efforts would grant us a better



understanding of the Painted Bunting's breeding distribution and could inform conservation efforts of this species in the eastern United States.

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