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WINTER SITE FIDELITY OF ORANGE-CROWNED WARBLERS (*OREOTHLYPIS CELATA*) IN THE LOWER RIO GRANDE VALLEY OF TEXAS

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ABSTRACT—We documented between-winter site fidelity of orange-crowned warblers (*Oreothlypis celata*) in the Lower Rio Grande Valley of Texas, between 2004 and 2017. Overall, we recaptured 13.9% of the 201 banded birds in ≥ 1 subsequent winter season: 20.8% of the 101 birds banded in urban natural areas, and 7.0% of the 100 banded in rural areas. We recaptured 8 birds ≥ 3 winters after their initial capture, indicating extended winter site fidelity.

RESUMEN—Documentamos la fidelidad al sitio invernal de los chipes oliváceos (*Oreothlypis celata*) en el Valle del Río Grande Baja de Texas entre 2004 y 2017. En general, se recapturó el 13.9% de los 201 individuos anillados en al menos una temporada invernal posterior: el 20.8% de los 101 individuos anillados en las áreas urbanas naturales, y el 7.0% de los 100 anillados en el área rural natural. Recapturamos 8 aves tres o más inviernos después de su captura inicial, lo que indica la fidelidad prolongada al sitio invernal.

The orange-crowned warbler (*Oreothlypis celata*) is a 9–10-g, insectivorous North American warbler (family Parulidae) commonly wintering across the southernmost United States and much of Mexico, well north of the winter range of most warblers. Many orange-crowned warblers winter in areas that regularly have low temperatures $<10^{\circ}\text{C}$ (Gilbert et al., 2010). Site fidelity, in which birds remain on a site throughout the winter or return to wintering locations in subsequent winters, may increase winter survival because of the birds' greater familiarity with local conditions. Ruiz-Gutierrez et al. (2016) estimated an average winter residency of 3.7 months by orange-crowned warblers at Mexican and Central American wintering sites, but there is little information on winter site fidelity (Somershoe et al., 2009).

The Lower Rio Grande Valley of Texas (Starr, Hidalgo, Cameron, and Willacy counties) has a subtropical climate with infrequent winter freezes, and many evergreen woody plants suitable for foliage-searching orange-crowned warblers (Rosenberg et al., 1991). The species occurs commonly during October–April in this region (Arvin, 2005; Lockwood and Freeman, 2014). Orange-crowned warblers occur in native thornscrub, thorn-forest, and taller riparian forest, as well as smaller urban natural areas. We predicted that we would see between-winter site fidelity. Urban natural areas may have more structurally diverse natural vegetation and consistently available water sources; therefore, we predicted greater site fidelity there compared with natural areas located in rural areas.

All study areas were subtropical thorn-forest (Brush, 2005) in Cameron or Hidalgo counties, <50 m above sea level. Our rural study area was within the 310-ha Arroyo Colorado unit of Las Palomas Wildlife Management Area, near Harlingen, Cameron County. We had two urban sites in southern Hidalgo County, both mixed thorn-forest and thornscrub with small openings: Quinta Mazatlan, a 16-ha park in McAllen, Texas, and Valley Nature Center, a 2.4-ha park in Weslaco, Texas. Park staff maintained feeding stations on a very irregular basis in both these areas, and we observed orange-crowned warblers feeding from oranges, when available.

We conducted banding of orange-crowned warblers as part of regular banding for a variety of species (M.H.C. performed all the banding; USFWS permit #22758). We typically used 30-mm mesh nets, opened at daylight for

approximately 5 h during the October–April nonbreeding season, 2004–2017 (we banded at Arroyo Colorado from 2004 to 2017, at Valley Nature Center from 2006 to 2017, and at Quinta Mazatlan from 2008 to 2017). Banding was much more frequent at the rural sites than at urban sites.

Overall, we recaptured 36 individuals (17.9%) of the 201 orange-crowned warblers that we banded, including birds recaptured in the same winter and in subsequent winters. Of the 101 birds banded at urban sites, we recaptured 26.7% at least once, showing greater overall winter site fidelity than the 9.0% (of 100 banded birds) recaptured at rural sites ($\chi^2 = 10.74$, $P < 0.01$).

Looking only at birds showing between-winter site fidelity, we recaptured 13.9% of the 201 banded birds in ≥ 1 subsequent winter (Table 1). Of the 101 birds banded at urban sites, we recaptured 20.8% in ≥ 1 subsequent winter, which was greater than 7.0% of the 100 birds at the rural site ($\chi^2 = 6.50$, $P < 0.05$). Overall, we recaptured 28.6% of the 28 birds showing between-winter site fidelity ≥ 3 winters after we banded them, indicating extended site fidelity. We recaptured two of those birds in winters ≥ 5 years after they were banded, both in the urban Quinta Mazatlan site. We banded one in 2009–2010 and recaptured it in 2016–2017. We banded the other in 2010–2011 and recaptured it in 2015–2016 and 2016–2017.

This is the first study to show regular between-winter site fidelity in orange-crowned warblers, especially in urban sites. Birds recaptured 3–7 winters after their original capture showed extended between-winter site fidelity. In the only other multiyear study, a 5-year, intensive banding study of nonbreeding site fidelity in central Florida, 15.4% (2 individuals) of the 13 orange-crowned warblers banded in winter were recaptured in the following winter season (Somershoe et al., 2009). Our urban winter site fidelity of 20.3% is greater than the 10.4% site fidelity for closely related Nashville warblers (*O. ruficapilla*) in urban southern Mexico (Monroy-Ojeda et al., 2013). Urban natural areas may be more attractive than rural natural areas to orange-crowned warblers because such areas are managed somewhat for biodiversity and often have feeding stations. The actual winter site fidelity in both urban and rural sites in the Lower Rio Grande Valley of Texas may be greater than we found and deserves further study.

TABLE 1—Banding frequency and number of orange-crowned warblers banded and recaptured in urban and rural study sites in the Lower Rio Grande Valley of Texas, 2004–2017.

Site	Visits	Banded	Recaptured	Recaptured ≥ 1 winter later	Recaptured ≥ 3 winters later
Rural	194	100	9	7	5
Urban	42	101	27	21	3
Grand total	236	201	36	28	8

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