

**Nota Científica**  
(Short Communication)

**NEW DISTRIBUTIONAL RECORDS FOR THE ENDANGERED WORTHEN'S SPARROW  
*SPIZELLA WORTHENI* IN SAN LUIS POTOSI, MEXICO**

Recibido: 21/03/2014; aceptado: 23/02/2015

**Canales-Delgadillo, J. C., Chapa-Vargas, L., Carlos Gómez, J. A., Arreola Aguirre, J.** 2015. Nuevos registros de distribución del gorrión de Worthen *Spizella wortheni* en San Luis Potosí, México. *Acta Zoológica Mexicana* (n. s.), 31(2): 313-317.

**RESUMEN.** El rango de distribución restringido y el pequeño tamaño poblacional del gorrión de Worthen han ocasionado que esta ave sea considerada una especie amenazada en México y a nivel internacional. Aquí reportamos nuevos registros de esta ave los cuales expanden su rango de distribución conocido en los últimos cuarenta años y abren la posibilidad del uso de hábitats adicionales que no habían sido documentados anteriormente. Por lo tanto es importante realizar esfuerzos para documentar posible actividad reproductiva en estos hábitats.

**Palabras clave:** Gorrión de Worthen, Altiplano, conservación, manejo, rango de distribución.

Among the Mexican Avifauna, the Worthen's sparrow (*Spizella wortheni*) is considered one of the rarest passerines. Its distribution range has been severely reduced presumably as a consequence of land use changes (Wege *et al.* 1993), which have modified the structure and function of ecosystems associated with arid and semiarid areas of the Mexican High Plateau.

The Worthen's sparrow has been included in the IUCN Red List as endangered, as well as in the Mexican list of species at risk (SEMARNAT 2010) as threatened due to the small recorded population size (BirdLife international 2000; Canales-Delgadillo & Scott-Morales 2012); and the limited number of sightings in areas other than those reported previously (Wege *et al.* 1993; Berhstock *et al.* 1997; Canales-Delgadillo *et al.* 2007; Scott-Morales *et al.* 2008; Canales del Castillo *et al.* 2010) for Coahuila, Nuevo Leon and northern San Luis Potosi.

Recent studies have focused on the genetic structure of the remaining populations, and how this bird copes with habitat loss (Canales-Delgadillo *et al.* 2012). The previous results, in addition to reporting behavioral habits of the species, suggested the possibility of the existence of unknown populations in other areas. The Worthen's sparrow, as other birds from arid and semiarid areas, shows nomadic behavior (Canales-Delgadillo *et al.* 2012). This implies that individuals constantly move across landscapes searching for areas having the best conditions to carry out

all their activities, including feeding, mating, nest construction, egg laying and hatching (Anderson 1980; Dean, 1997, 2004). This behavior could facilitate the establishment of populations in areas not previously occupied, abandonment and re-colonization of previously occupied sites and partial isolation of these newly established populations for a number of generations. Nevertheless, these processes could also benefit the species by promoting gene flow between populations and the increase of the overall genetic variability. On the other hand, nomadism might also complicate the identification of the entire distribution range of the species.

Here we report new distributional findings of the Worthen's sparrow in San Luis Potosi, Mexico. These records constitute the southernmost sightings recorded in the Mexican High Plateau in the last 40 years.

We conducted bird surveys from August to November 2012 and from March to November 2013 in the municipalities of Catorce and Charcas, in an area known as the "Zona Ixtlera" of San Luis Potosi (Fig. 1) that is part of Wirikuta, a protected area which possess a high biodiversity value because endangered plant species from the Cactaceae family and others occur. Nine sampling sites were established within three ejidos locally known as "Guadalupe Victoria", "Presa de Santa Gertrudis" and "La Cardoncita" based on vegetation characteristics (Table 1). Vegetation types in the region include 1) "Izotal": rosetophil shrublands dominated by arboreal elements of the *Yucca* genus and a combination of creosote bush (*Larrea tridentata*) and tarbush (*Flourensia cernua*) as the dominant species at the shrub layer, and 2) microphyllous shrublands dominated by creosote bush in which the tree layer has been eliminated; for several decades, local inhabitants extracted the fiber from *Yucca* trees located in the immediacies of small villages to manufacture ropes. More recently, this activity has been abandoned, but intense goat grazing now inhibits tree establishment (Authors pers. obs.).

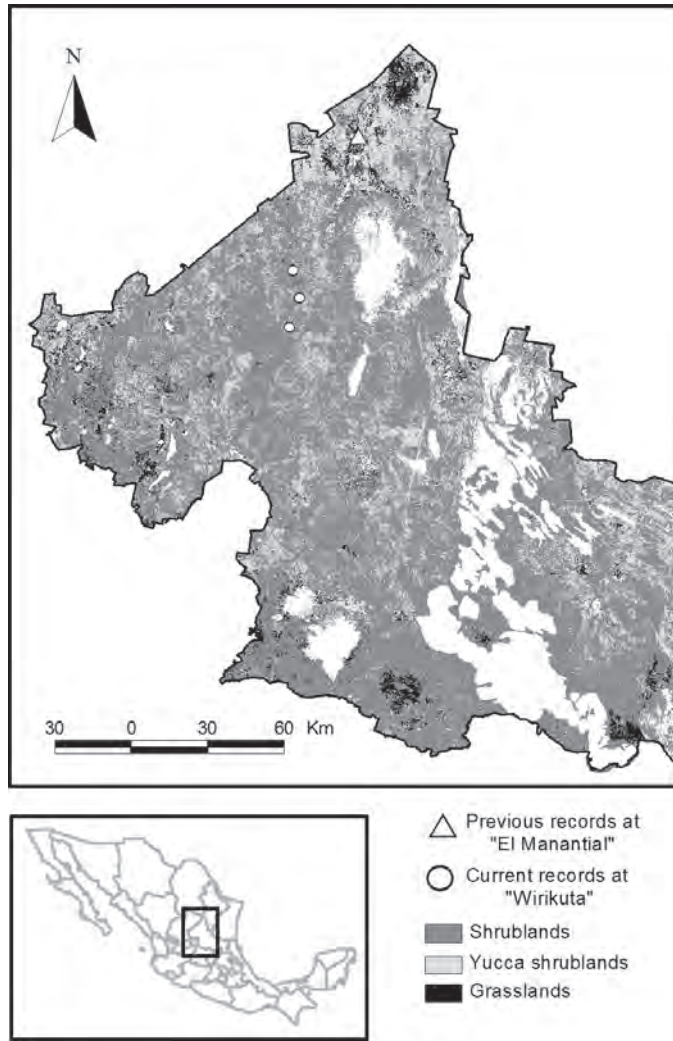
Bird surveys consisted of operating 21 12 m x 2.5 m mist nets during three consecutive days and conducting line transects of approximately 500 m in length in each

of the nine study sites from sunrise until approximately 1100 GMT/UTC.

We heard and sighted three Worthen’s sparrow males during the morning of 10 and 11 May 2013. All three

individuals were located in an area of Izotal dominated by *Yucca spp.* and creosote bush where the shrub height ranged from 1.4 to 1.6 m. The same dates we captured three individuals in nets; two on 10 May, and one on 11 May. Two more Worthen’s sparrows were captured at the same site on 25 and 27 October, 2013, and one more individual was captured in the same site a year later, on 19 June 2014. These captures allowed us to confirm the identity of the species (Fig. 2). We measured and weighed the captured birds and conducted visual exploration for sexing as recommended by Ralph *et al.* (1993) (Table 2). One of the captured individuals in May had an enlarged cloacal protuberance, suggesting possible reproductive activity. All three captured individuals were marked with aluminum leg bands, provided by the Secretariat of the Environment and Natural Resources (SEMARNAT), and released. On subsequent surveys, a single Worthen’s sparrow male was heard and sighted in the afternoon of 1 June 2013 in an area of microphyllous shrubland which has been degraded by *Yucca spp.* extraction and goat overgrazing. This area is dominated almost exclusively by creosote bush but with scattered presence of tarbush. On 10 July 2013, we sighted three more Worthen’s sparrows in an area located near the ejido “La Cardoncita”. These birds were singing males perched on *Yucca spp.* trees and creosote bushes on both sides of a rural road.

The findings of the Worthen’s sparrow in our study area together with the records reported in the internet by Rene Valdés and Cinthya Ruiz Heredia (eBird 2012), increases its known distribution range 66 to 91 km to the south. Previously published southernmost records for this species correspond to an area known as El Manantial (Fig. 1, Canales-Delgadillo *et al.* 2012) characterized by the presence of microphyllous shrubland mixed with short grassland which is also located in San Luis Potosi. Our findings validate the observations reported in the internet by Valdés and Ruiz near to our study area. These



**Figure 1.** Study area and location of previous and current records of the Worthen’s sparrow.

**Table 1.** Vegetation type, site code (ID) and location of sampling sites.

Vegetation type	Sampling site	ID	Coordinates UTM Q14
Izotal: <i>Yucca sp.</i> dominated with a mixture of creosote bush ( <i>Larrea tridentata</i> ), tarbush ( <i>Flourensia cernua</i> ) and cacti. Shrub layer height 1.4-1.6 m.	Guadalupe Victoria	GVI	E 278138 N 2586736
	Presa Santa Gertrudis	SGI	E 278624 N 2593012
	La Cardoncita	LCI	E 274891 N 2607712
Microphyllous shrublands dominated by: Creosote bush; Tarbush might also be present in low densities, and <i>Yucca</i> trees are scarce. Highly impacted by goat overgrazing and <i>Yucca</i> extraction. Shrub layer height < 1.4 m.	Guadalupe Victoria	GVG	E 274258 N 2579464
	Presa Santa Gertrudis	SGG	E 277698 N 2597368
	La Cardoncita	LCG	E 271366 N 2609731
Villages: Rural inhabited areas where most natural vegetation was removed. Some <i>Yucca</i> trees, mesquites and backyard <i>Opuntia</i> plantations compose the vegetation cover.	Guadalupe Victoria	GVP	E 276116 N 2582864
	Presa Santa Gertrudis	SGP	E 277976 N 2599358
	La Cardoncita	LCP	E 271750 N 2610760



**Figure 2.** Individual Worthen's sparrow captured on May 10, 2013.

last reports did not provide details about sexes or reproductive activity. Valdés, reported sightings of the species from January 2010 to February 2011 near Santo Domingo, a small town located approximately 75 km northwest of Charcas, San Luis Potosí, and on February 2013 Ruiz Heredia recorded 45 Worthen's sparrows at the southern portion of the latter locality. These reports did not specify vegetation characteristics of the sites accompanying these records, and there are no details on the number of

birds observed by Valdés (eBird 2012). Because vegetation around these towns is highly heterogeneous, ranging from bare soils to induced grasslands, and disturbed shrublands, it is difficult to infer the vegetation types to which these birds were associated.

Our findings have several implications regarding habitat associations of the species and to prioritize conservation planning. First, the Worthen's sparrow may be able to use more habitat types than previously reported

**Table 2.** Measurements, identification information and coordinates of Worthen's sparrows recorded in San Luis Potosi, including five individuals captured and banded.

Individual	Sex	Weight (g)	Wing (mm)	Culmen (mm)	Total length (mm)	Ring number	Site	Date (dd/mm/yy)	Coordinates UTM Q14
1	U	13	71	8.4	131	B00474	SGI	10/05/13	E 278451 N 2592736
2	U	12	71	8.7	138	B00467	SGI	10/05/13	E 278711 N 2592906
3	M	14	68	5.5	128	B00473	SGI	11/05/13	E 278711 N 2592906
4	M	—	—	—	—	—	GVG	01/06/13	E 274117 N 2579463
5	M	—	—	—	—	—	LCI	10/07/13	E 276059 N 2605635
6	M	—	—	—	—	—	LCI	10/07/13	E 276056 N 2605716
7	U	12	68	8	131	F00075	SGI	25/10/13	E 278500 N 2592989
8	U	12	70	8.6	131	F00063	SGI	27/10/13	E 278500 N 2592989

Footnote table 2: U = unknown, M = male. Sites as in table 1.

(see Scott-Morales *et al.* 2008; Canales-Delgadillo & Scott-Morales 2012). This species is considered to be closely associated to habitats where Mexican prairie dog (*Cynomys mexicanus*) colonies exist, and therefore this bird was regarded as highly restricted to the shrub-grassland areas that these mammals inhabit (Scott-Morales *et al.* 2008). The records we report here, and those made by Valdés and Riuz correspond to sites where there are neither colonies of the Mexican prairie dog nor areas of association between grasslands and shrubs. This result opens the possibility that shrublands dominated by *Yucca spp.* and/or tall individuals of creosote bush and tarbush could provide habitat for this endangered species. However, whether Izotal and microphyllous shrubland landscapes with moderate to intense disturbances created by anthropogenic activities in the region provide habitat for this species is a hypothesis that still needs to be evaluated. Our sightings may have been related to various possibilities such as nomadic movements of some individuals, dispersal irruptive movements, range expansion resulting from anthropogenic disturbances, or simply because in the past not enough ornithological surveys had been conducted in the region. The only evidence we have so far in favor of the range expansion due to anthropogenic disturbances consists of the presence of singing males and one individual with a cloacal protuberance which suggests there could be more breeding sites than those currently known (Canales-Delgadillo *et al.* 2007; Garza de-León *et al.* 2007; Canales-del Castillo *et al.* 2010), and that the records presented here were made both within the breeding and non-breeding seasons, but no direct breeding evidence has been obtained so far. Secondly, the presence of the Worthen's sparrow in Wirikuta enhances the importance of this protected area significantly. The Worthen's sparrow joins more than 60 resident and migratory bird species that inhabit in the area (Garza-Hurtado 2011). Finally, increasing our understanding of actual current

distribution range and location of possible unknown populations is necessary in order to prioritize conservation actions. Efforts to conserve and effectively manage this area should be implemented in order to preserve the habitat needed by this endemic bird and other species.

**ACKNOWLEDGMENTS.** We thank the useful comments and suggestions of two anonymous reviewers to improve this report and to the public database eBird for publishing information on the records made by Rene Valdés and Cinthya Ruiz Heredia.

## LITERATURE CITED

- Andersson, M. 1980. Nomadism and site tenacity as alternative reproductive tactics in birds. *Journal of Animal Ecology*, 49: 175-184.
- Behrstock, R. A., Sexton, C. W., Lesley, G. W., Eubanks, T. L. & Gee, J. P. 1997. First nesting records of Worthen's sparrow (*Spizella wortheni*) for Nuevo Leon, Mexico, with habitat characterization of the nest site and notes on ecology, voice, additional sighting and leg coloration. *Cotinga*, 8: 27-33.
- BirdLife International. 2000. *Threatened Birds of the World*. Lynx editions and BirdLife International. Barcelona and Cambridge, UK. P: 542.
- Canales-Delgadillo, J., Scott-Morales, L., Cotera Correa, M. & Pando, M. M. 2007. Observaciones sobre la temporada reproductiva de *Spizella wortheni*. *Ciencia-UANL*, 10(2): 160-167.
- Canales-Delgadillo, J., Scott-Morales, L. & Korb, J. 2012. The influence of habitat fragmentation on genetic diversity of a rare bird species that commonly faces environmental fluctuations. *Journal of Avian Biology*, 43: 168-176.
- Canales-Delgadillo, J. & Scott-Morales, L. 2012. *Uso de hábitat y relaciones sociales. El gorrión de Worthen en el Altiplano Mexicano*. Editorial Académica Española. Saarbrücken, Deutschland.
- Canales-del Castillo, R., González-Rojas, J. I., Ruvalcaba-Ortega, I. & García-Ramírez, A. 2010. New breeding localities of Worthen's Sparrows in northeastern Mexico. *Journal of Field Ornithology*, 81: 5-12.
- Dean, W. R. J. 1997. The distribution and biology of nomadic birds in the Karoo, South Africa. - *Journal of Biogeography*, 24: 769-779.
- Dean, W. R. J. 2004. *Nomadic desert birds*. - Springer. Berlin Heidelberg.

- eBird.** 2012. eBird: An online database for bird distribution and abundance [web application]. eBird, Ithaca New York. Available: <http://www.ebird.org> (accessed January 13 2014).
- Garza de León, A., Moran, R. I., Cancino, F., Tinajero, H. R. & López, S.** 2007. Parámetros reproductivos y nueva localidad de anidación para el gorrión de Worthen (*Spizella wortheni*) en el estado de Coahuila, México. *Ornitología Neotropical*, 18: 243-249.
- Garza-Hurtado, F.** 2011. Respuesta de la avifauna a los cambios en la estructura vegetal en un gradiente de degradación del altiplano potosino. M.Sc. Thesis. Instituto Potosino de Investigación Científica y Tecnológica A.C. México.
- Ralph, C. J., Geupel, G. R., Pyle, P., Martin, T. E. & DeSante, D. F.** 1993. *Handbook of field methods for monitoring land birds. Gen. Tech. Rep. PSW-GTR-144-www*, U.S. Dept of Agriculture, CA, USA.
- Scott-Morales, L. Necedal, J., Cotera, M. & Canales-Delgadillo, J. C.** 2008. Worthen's sparrow (*Spizella wortheni*) in the northern Mexican Plateau. *Southwestern Naturalist*, 53: 91-95.
- Secretaría de Medio Ambiente y Recursos Naturales, SEMARNAT.** 2010. Norma Oficial Mexicana (NOM-059-SEMARNAT-2010), Protección ambiental-Especies Nativas de México de Flora y Fauna Silvestres-Categorías de Riesgo y Especificaciones para su Inclusión, Exclusión o Cambio-Lista de Especies en Riesgo. Diario Oficial de la Federación. 30 de diciembre de 2010, México, DF.
- Wege, D. C., Howell, S. N. G. & Sada, A. M.** 1993. The distribution and status of Worthen's sparrow *Spizella wortheni*: a review. *Bird Conservation International*, 3: 211-220.

**JULIO C. CANALES-DELGADILLO,<sup>1</sup> LEONARDO CHAPA-VARGAS,<sup>1</sup> JORGE A. CARLOS GÓMEZ<sup>2</sup> Y JACHAR ARREOLA AGUIRRE<sup>2</sup>**

<sup>1</sup>División de Ciencias Ambientales, Instituto Potosino de Investigación Científica y Tecnológica A. C. Camino a la Presa San Jose 2055. C.P. 78218, San Luis Potosí, México. <julio.canales@ipicyt.edu.mx> Corresponding author: <lchapa@ipicyt.edu.mx>

<sup>2</sup>Centro Universitario de Ciencias Biológicas y Agropecuarias UDG. Km 15.5 Carretera a Nogales, Predio las Agujas, Zapopan, Jalisco, México. <jacg250686@hotmail.com> <thc-snake.soul@hotmail.com>