

ORNITOLOGÍA NEOTROPICAL

(2016) 27: 267–273

ORIGINAL ARTICLE



CURRENT DISTRIBUTION, HABITAT USE, AND BREEDING RECORDS OF THE HOUSE SPARROW (*PASSER DOMESTICUS*) IN VENEZUELA

Cristina Sainz-Borgo¹ · Sandra Giner² · José A. González-Carcacía³ · Sabina Caula⁴ · Fidel Escola Bracho⁵ · Juan Carlos Fernández-Ordóñez⁶ · Cheyla Hernández⁵ · Marieta Hernández⁷ · Gedio Marín-Espinoza⁸ · Lermith Torres⁹ · Adriana Rodríguez-Ferraro¹⁰

¹Departamento de Biología de Organismos, Universidad Simón Bolívar, Apdo. 89.000, Valle de Sartenejas 1080-A, Miranda, Venezuela.

²Universidad Central de Venezuela, Facultad de Ciencias, Instituto de Zoología y Ecología Tropical, Caracas 1050, Venezuela.

³Centro de Ecología, Instituto Venezolano de Investigaciones Científicas, Carretera Panamericana Km 11, Altos de Pipe, 21827, Miranda, Venezuela.

⁴Escuela de Biología, Facultad Experimental de Ciencia y Tecnología, Universidad de Carabobo, Valencia, Carabobo 2001, Venezuela.

⁵Museo de Biología de la Universidad del Zulia, Facultad Experimental de Ciencias, Universidad del Zulia, Apartado 526, Maracaibo 4011, Zulia, Venezuela.

⁶Fundación Científica ARA MACAO, Apartado Postal 94, San Carlos 2201, Cojedes, Venezuela.

⁷Sociedad Conservacionista Audubon de Venezuela, Edif. Sociedad Venezolana de Ciencias Naturales, El Marqués 1010, Caracas, Venezuela.

⁸Laboratorio de Ecología de Aves, Departamento de Biología, Universidad de Oriente, Cumaná 245, Sucre, Venezuela.

⁹Movimiento Ambientalista No Gubernamental La Educación (MANGLE), Los Puertos de Altigracia 4036, Zulia, Venezuela.

¹⁰Departamento de Estudios Ambientales, Universidad Simón Bolívar, Apdo. 89.000, Valle de Sartenejas 1080-A, Miranda, Venezuela.

E-mail: Adriana Rodríguez-Ferraro · rodrigueza@usb.ve

ABSTRACT · The House Sparrow (*Passer domesticus*, Passeridae), native to Eurasia and northern Africa, was introduced to the Americas and Australia where it inhabits mainly urban environments. The objective of this study was to determine the distribution of the House Sparrow in Venezuela from our own observations and data reported in personal communications, published material, and eBird records. House Sparrows were recorded for first time in Venezuela in 1996 at the port of La Guaira. Since then, records have increased, and we found 133 records of the House Sparrow until July 2015, in the states of Falcón, Zulia, Vargas, Miranda, Carabobo, Anzoátegui, and Los Roques Archipelago. The states of Falcón and Vargas included the greatest number of records, and 2015 was the year with the most records. Most sightings occurred in urban areas of coastal Venezuela. House Sparrows were recorded within three protected areas: Refugio de Fauna Silvestre de Cuare (Falcón), Refugio de Fauna Silvestre y Reserva de Pesca Ciénaga de los Olivitos (Zulia), and Parque Nacional Archipiélago Los Roques. Two records for Caracas, one for Barquisimeto and another for Margarita Island, need confirmation. Breeding was confirmed in five states where the House Sparrow is currently present, and records indicated that the nesting season extends from February to November. Most nests (84%) were located in man-made structures, but two breeding records included a nesting colony in cavities of an exotic palm (*Phoenix* sp.) in Falcón and a nest under a pile of dead coral fragments in Los Roques Archipelago. We found evidence of foraging on new food items from two coastal trees (*Conocarpus erectus* and *Coccoloba uvifera*). Formal research and long-term surveys are required to assess the functional ecological role of this exotic species in the avian communities of Venezuela.

RESUMEN · Distribución actual, uso de hábitat y registros reproductivos del Gorrión Común (*Passer domesticus*) en Venezuela

El Gorrión Común (*Passer domesticus*, Passeridae), nativo de Eurasia y el norte de África, fue introducido en gran parte de América y Australia, donde ocupa principalmente hábitats urbanos. El objetivo de este trabajo consistió en determinar la distribución del Gorrión Común en Venezuela con base en nuestras observaciones y datos reportados en comunicaciones personales, material publicado y registros en eBird. Los Gorriones Comunes se registraron por primera vez en Venezuela en 1996 en el puerto de La Guaira. Desde entonces, el número de registros se ha incremen-

Receipt 16 October 2015 · First decision 12 April 2016 · Acceptance 21 November 2016 · Online publication 7 December 2016

Communicated by Francisco Vilella © The Neotropical Ornithological Society

tado y nosotros encontramos 133 registros de Gorrión Común fechados hasta el julio de 2015 para los estados Falcón, Zulia, Vargas, Miranda, Carabobo, Anzoátegui y el Archipiélago de Los Roques. Los estados con mayor número de registros fueron Falcón y Vargas, y el año con el mayor número de registros fue 2015. La mayor parte de los avistamientos se realizaron dentro de áreas urbanas en la costa de Venezuela. Se registraron gorriónes en tres áreas protegidas: el Refugio de Fauna Silvestre de Cuare (Falcón), el Refugio de Fauna Silvestre y Reserva de Pesca Ciénaga de los Olivitos (Zulia) y el Parque Nacional Archipiélago Los Roques. Dos reportes de avistamientos para Caracas, uno para Barquisimeto y otro para la Isla de Margarita requieren confirmación. La reproducción fue confirmada en cinco de los estados donde el Gorrión Común está presente actualmente, y los registros indican que la época reproductiva se extiende de febrero a noviembre. La mayoría de los nidos (84%) se ubicaron en estructuras hechas por el hombre, pero dos registros reproductivos incluyen una colonia de anidación en cavidades de una palma exótica (*Phoenix* sp.) en Falcón, y un nido bajo una pila de fragmentos de coral muerto en el Archipiélago de Los Roques. Encontramos nueva evidencia de alimentación con ítems de dos árboles costeros (*Conocarpus erectus* y *Coccoloba uvifera*). Estudios formales y monitoreo a largo plazo son necesarios para evaluar el rol ecológico funcional de esta especie exótica en las comunidades de aves en Venezuela.

KEY WORDS: Breeding · Distribution · Expansion · House Sparrow · Invasion · *Passer domesticus* · Venezuela

INTRODUCTION

The House Sparrow (*Passer domesticus*) is one of the most widespread vertebrate species (Anderson 2006). Originally distributed in Europe, northern Asia, northwestern Africa, and the Middle East, the House Sparrow has been introduced in the American continent and Caribbean islands, southern Africa, Australia, New Zealand, and numerous near-shore and oceanic islands (Anderson 2006).

The current distribution of House Sparrows in the New World is the result of a series of deliberate introductions in the 19th and early 20th centuries and subsequent natural range expansions of established populations. In the Americas, the first introduction of House Sparrows occurred in New York City in 1853, and after additional introductions of individuals from Great Britain and Germany, by 1910 the species had expanded throughout the United States and southern Canada, with an average rate of range expansion of 72 km/year (Robbins 1973, Anderson 2006). House Sparrows from North America expanded southward into Mexico reaching the Tehuantepec Isthmus in 1947, and during the following 30 years continued through Guatemala, El Salvador, Costa Rica, and Panama, where the species was recorded for the first time in 1976 (Reynolds & Stiles 1982, Thurber 1986). In South America, House Sparrows were introduced in Buenos Aires, Argentina (1872); Santiago, Chile (1904); and Rio de Janeiro, Brazil (1906).

Individuals from established Argentinean populations were introduced to Uruguay and Peru before expanding to Paraguay and Bolivia (Smith 1973, Ridgely & Tudor 1989, Anderson 2006). In all these countries, except Peru, House Sparrows are currently widespread and common. In northern South America, the species is restricted to some localities in western Colombia, western Ecuador, and one locality in French Guiana (Ridgely & Tudor 1989, Restall et al. 2007). House Sparrows have also been introduced to many of the Caribbean islands including Cuba (1865), Jamaica (1902), Bahamas (1903), St. Thomas (1950s), Hispaniola (1976), Puerto Rico (1978), St. Martin (1999), and Guadeloupe (2000) (Levesque & Clergeau

2002, Raffaele et al. 2003, Anderson 2006). In the Netherland Antilles, the House Sparrow was first reported in Curaçao in 1953 but did not experience an island-wide expansion until the late 1980s, whereas in Aruba the first colony was discovered in 1978 (Voous 1985, de Boer 2008). In Bonaire, first records of House Sparrows occurred in 2000 and 2001 (Ligon *in litt*).

Despite of the extensive geographic distribution and continuous expansion of the House Sparrow in South America and the Caribbean, it remained absent from Venezuela until first recorded in 1996 (Sharpe et al. 1997) at the port of La Guaira (Vargas state). Records of House Sparrows in Venezuela have increased both in number and in geographical extent since 2001 (Azpiroz et al. 2006, Ramoni-Perazzi et al. 2007, Padrón López & Lentino 2013, Torres & Uzcátegui-Prieto 2014). Here, we compile all records for the species to assess the current distribution and status of the House Sparrow in Venezuela.

METHODS

We created a database of House Sparrow records for Venezuela until 2015 (See online Appendix). Information sources were published articles, personal observations, and eBird records (Sullivan et al. 2009, eBird 2015). For each sighting, we recorded the following: date, locality, state, geographic coordinates, as well as number and sex of individuals. Notes on habitat use, breeding, and diet were also added to the database.

RESULTS

Presence and current distribution. Information on the presence of House Sparrows in Venezuela was derived from 30 records in five published articles (Sharpe et al. 1997, Azpiroz et al. 2006, Ramoni-Perazzi et al. 2007, Padrón López & Lentino 2013, Torres & Uzcátegui-Prieto 2014), 76 observations conducted by ourselves or other colleagues, as well as 27 records obtained from eBird (www.ebird.org). Based on these, we compiled 133 records of 384 individual

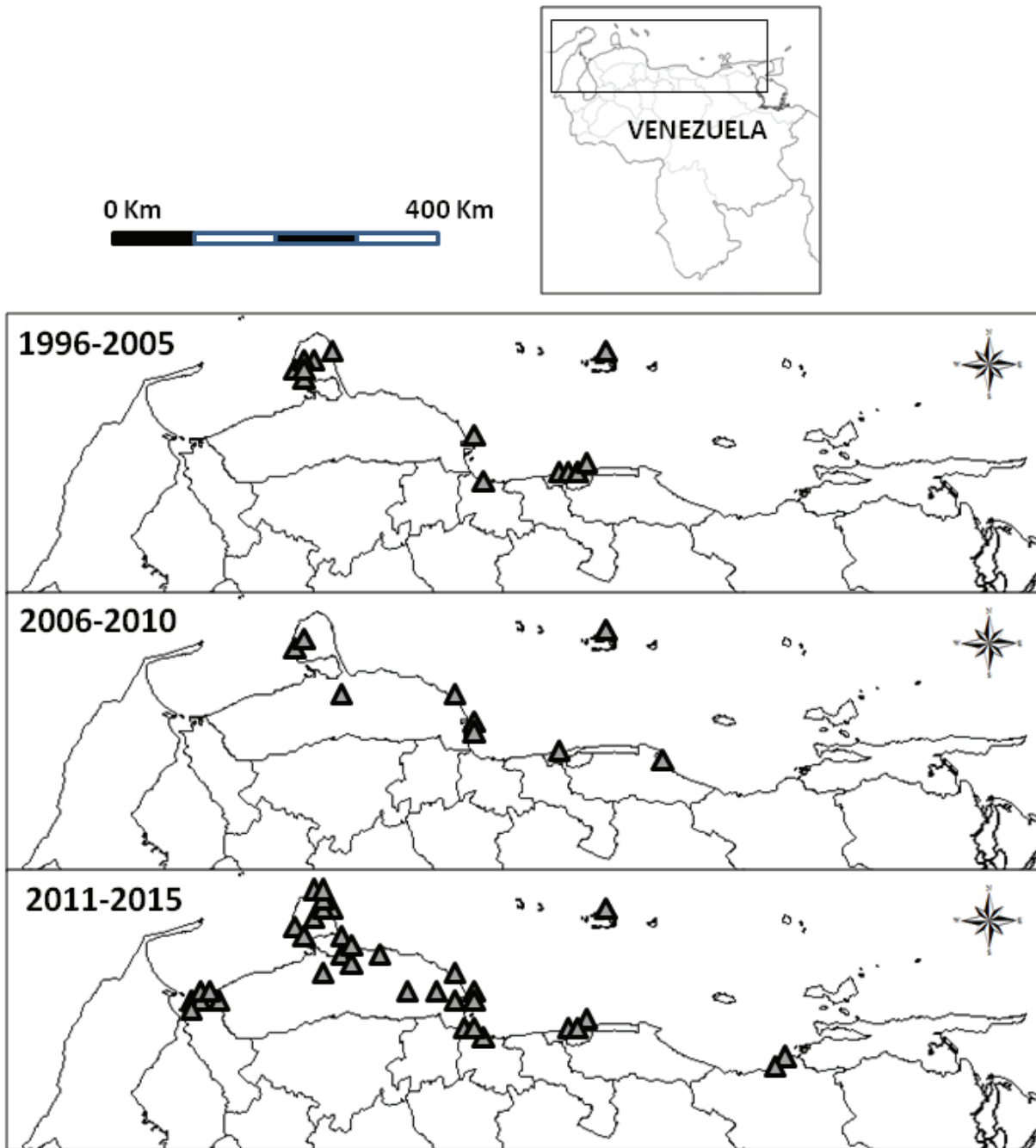


Figure 1. Temporal changes in the distribution of the House Sparrow (*Passer domesticus*) in northern Venezuela based on records between 1996 and 2015. Gray triangles indicate record localities.

House Sparrows in localities belonging to six Venezuelan states: Falcón, Carabobo, Zulia, Vargas, Miranda, Anzoátegui, and Los Roques Archipelago (Figure 1). This does not include the number of birds at localities described by Azpiroz et al. (2006), since no information on House Sparrow abundance for all records is reported by the authors. All House Sparrow records came from localities located on the coast in western (Zulia and Falcón), central (Vargas, Miranda, Carabobo, Los Roques Archipelago), and eastern (Anzoátegui) Venezuela. The state with the highest number of records was Falcón ($N = 79$; 59%), followed by Vargas ($N = 24$; 18%). The House Sparrow

population in Venezuela has expanded considerably since 2010 (Figure 1), particularly in western Venezuela. After the original records in Falcón state by Azpiroz et al. (2006) in the Paraguaná peninsula, these birds are currently widespread not only there but also in the central, eastern, and western parts of Falcón and in neighboring western Zulia state. The expansion in eastern Venezuela is more recent and is restricted to two nearby localities in Anzoátegui state, where House Sparrows were recorded for first time in 2012.

The number of House Sparrow observations seems to have increased over time and most records

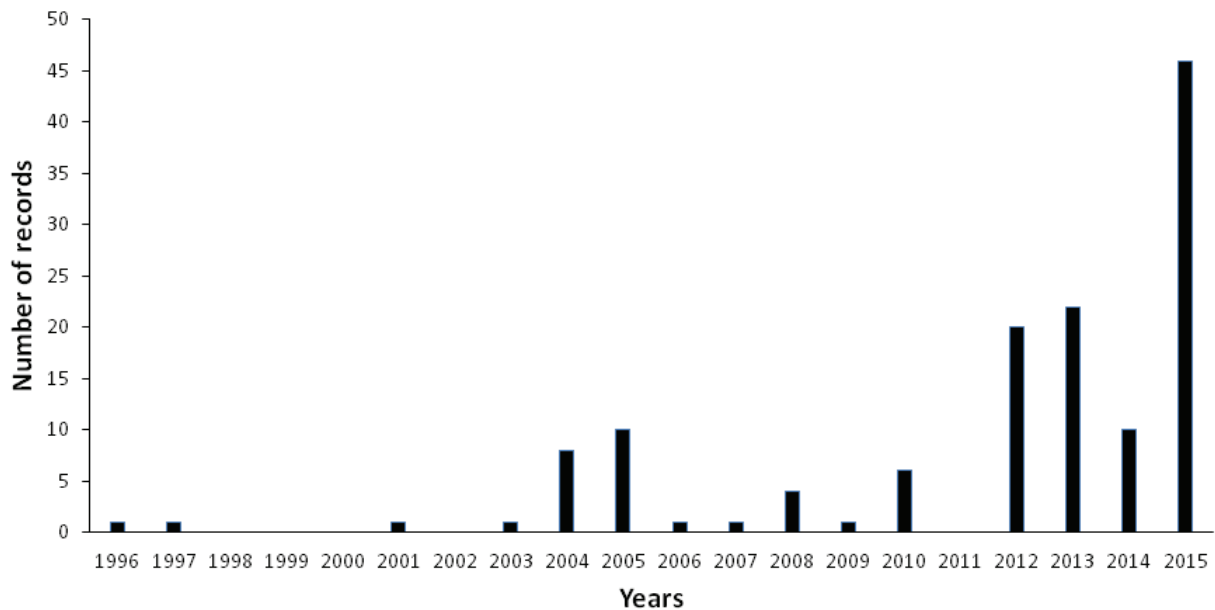


Figure 2. Number of records of House Sparrows (*Passer domesticus*) in Venezuela between 1996 and 2015.

($N = 104$; 78%) correspond to the last five years (Figure 2). The year with more sightings was 2015, when birds were observed in Falcón (Figures 3A and 3B), Vargas, Zulia (Figure 3C), Anzoátegui, and in Los Roques Archipelago (Figure 3D). House Sparrows were recorded in cities, small towns, and villages ($N = 127$; 95% of all records) as well as in some natural areas ($N = 6$; 5% of all records). Of the total number of records, 29 (22%) corresponded to single individuals, 38 (29%) were pairs, and 66 (49%) were groups of three or more individuals (average group size \pm SD = 9.2 ± 8.2 ; maximum group size = 35 individuals). Seven reports (5%) did not indicate the number of individuals observed, of which six are included in Azpiroz et al. (2006) and the other one was a personal observation (JAGC).

We identified four eBird records that need confirmation: 1) Coche, Caracas ($10^{\circ}28'17.8''N$, $66^{\circ}54'04.5''W$) on 1 December 1978; 2) La Restinga National Park, Nueva Esparta ($11^{\circ}01'47.3''N$, $64^{\circ}11'35.0''W$), on 29 and 31 March 2006; 3) Barquisimeto ($10^{\circ}02'04.2''N$, $69^{\circ}24'12.9''W$), Lara state on 23 November 2014; and 4) San Bernardino, Caracas ($10^{\circ}30'50.3''N$, $66^{\circ}53'44.1''W$) on 7 April 2015. We consider these records as doubtful and in need of confirmation because there is no photographic evidence that supports them and observers could not be located to verify the presence of House sparrows at these sites. Additionally, three of these localities (1, 3, and 4) were in large cities and the other one (2) was in an arid scrub within a national park frequented by ornithologists and birders. It seems unlikely that House Sparrows, if present, have not been further recorded in these localities.

House Sparrows were reported within the borders of two wildlife refuges: 1) Refugio de Fauna Silvestre de Cuare, Falcón on April 2010 and February 2015, and 2) Refugio de Fauna Silvestre y Reserva de Pesca

Ciénaga de Los Olivitos (hereafter, Los Olivitos), Zulia on May 2012 (Torres & Uzcátegui-Prieto 2014). These records are part of our own observations (CSB, SG, and LT) and there is photographic evidence for Los Olivitos.

Habitat use. The majority (95%) of observations ($N = 127$) were made in urban areas, at gas stations, town squares, electric poles and lines, gardens, restaurants, houses, and garbage dumps. In Vargas, House Sparrows are common in the parking lot of the international airport. Only six observations were recorded in natural habitats, namely mangrove forests in Refugio de Fauna Silvestre de Cuare (Falcón) and Gran Roque Island (Los Roques Archipelago), and arid scrub in Paraguaná Peninsula (Falcón). In Los Roques, although the archipelago is a national park, House Sparrows were found mostly around houses in the town on Gran Roque Island, but some individuals were also observed in the mangroves and near the lagoon on this island. Torres & Uzcátegui-Prieto (2014) observed House Sparrows perched on shrubs in Los Olivitos, but they did not describe the habitat used by these birds.

Feeding records. We found only six records of House Sparrows feeding on food waste, such as bread crumbs and rice (pers. observ.). In addition, House Sparrows fed on seeds of Silver-leaved Buttonwood (*Conocarpus erectus*) in Los Olivitos during October 2012 (Torres & Uzcátegui-Prieto 2014) and on fruits of the Sea Grape (*Coccoloba uvifera*) in Los Roques on July 2014 (F. Cavada pers. comm.). At this location, House Sparrows were also photographed while feeding on the ground with Common Ground-Doves (*Columbina passerina*) in a patch of a halophyte plant (*Heliotropium curassavicum*), but food items could not be determined (Figure 3D).

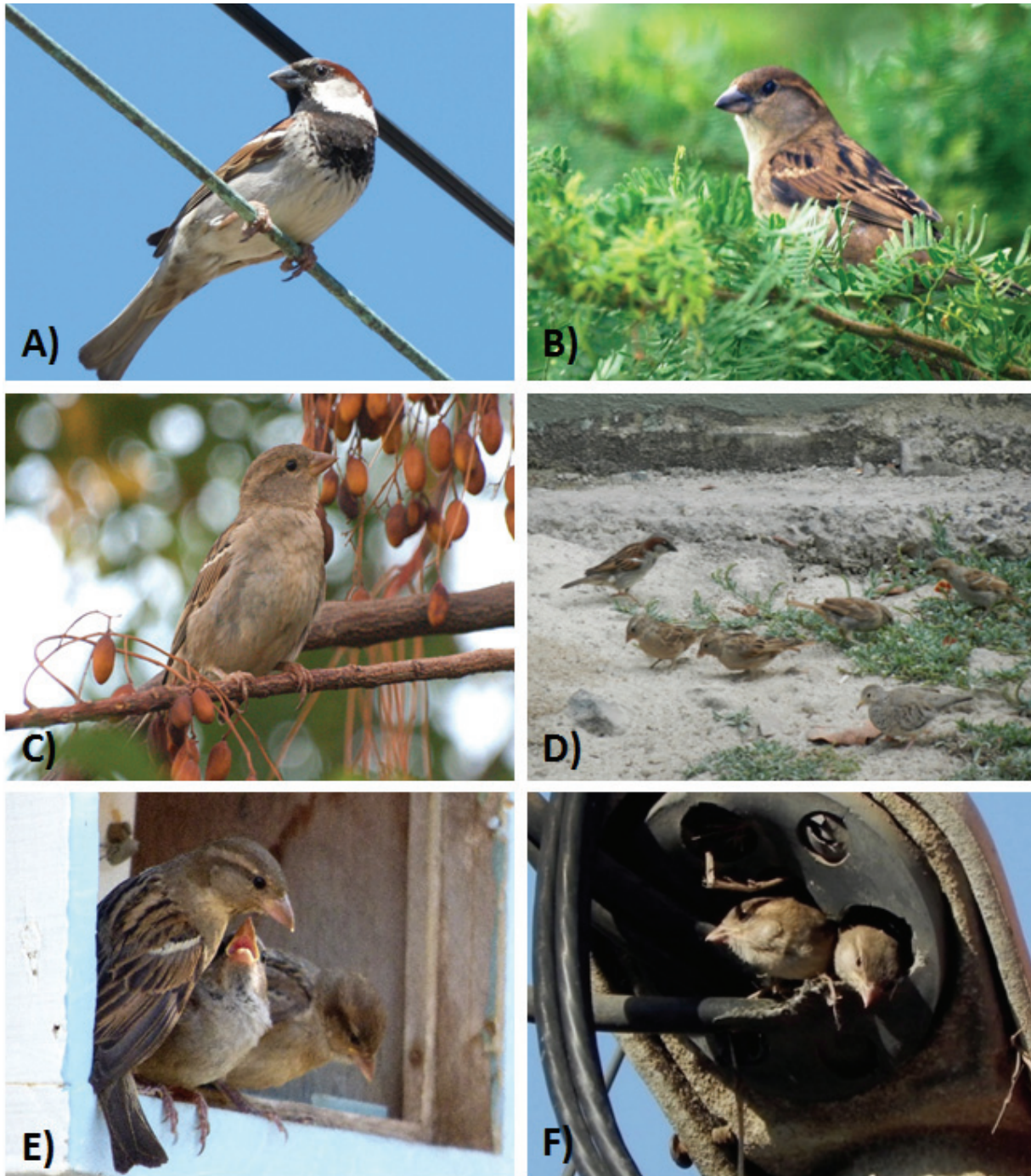


Figure 3. House Sparrows (*Passer domesticus*) at different locations in Venezuela. A) Male in Paraguaná Peninsula, Falcón, January 2014 (photograph by B. Allegra). B) Female in a garden in the Paraguaná Peninsula, Falcón, November 2012 (photograph by JAGC). C) Female in Ancón de Iturre, Zulia, July 2013 (photographs by LT). D) House Sparrows foraging on the ground in Los Roques Archipelago (photograph by F. Cavada). E) Fledglings, Paraguaná Peninsula, Falcón, January 2014 (photograph by B. Allegra). F) Fledglings on a street lamp, Lechería, Anzoátegui, February 2014 (photograph by C. Villaba).

Breeding records. Breeding was confirmed in five states from February to November. The state of Falcón included the greatest number of breeding records ($N = 7$), where House Sparrows were observed breeding at six localities, one in central Falcón, in the town of Pedregal in June 2012, and five in the Paraguaná Peninsula (Figure 3E): Pueblo Nuevo and Punto Fijo in June 2004 (Azpiroz et al. 2006) and June

2013, Los Taques in April 2008 and August 2010, San Félix in November 2014, and Guamacho in June 2013. Records in Vargas included nests in Maiquetía and Catia La Mar from February to May 2005 (Azpiroz et al. 2006) and one in Playa Grande on July 2010. Other breeding records came from three localities in Zulia: Ancón de Iturre, Boca del Palmar, and Los Olivitos on May 2012, October 2012, and February 2013, respec-

tively (Torres & Uzcátegui-Prieto 2014). Further nesting was recorded from Puerto Cabello, Carabobo on October 2014, and from Lechería (Figure 3F) in Anzoátegui on August 2014. Interestingly, the last record occurred in the area most recently colonized by House Sparrows in the country. Ten (84%) breeding records included nests located in man-made structures, such as street lamps, electricity boxes, wall holes or cracks, air conditioners, or under bridges. Only two nesting records were in natural substrates, a nesting colony in cavities of an exotic palm (*Phoenix* sp.) in Punto Fijo, Falcón (Azpiroz et al. 2006) and a nest under a pile of dead corals in Los Roques (F. Cavada pers. comm.).

DISCUSSION

Since its first record in 1996, the House Sparrow has become a common species in some localities across the Venezuelan coast, and our results indicate a considerable expansion of this species in the last 10 years, especially in the northwestern part of the country. It is unknown how House Sparrow reached Venezuela, and no reports are available of intentional releases in the country, contrary to other countries in the Americas where House Sparrows were purposefully introduced by European immigrants (Robbins 1973, Smith 1973, Anderson 2006). Considering that House Sparrows are distributed along the coast, likely hypotheses of its introduction in Venezuela may include overseas dispersal from the Netherland Antilles, transportation by industrial or cruise ships, or a combination of both. However, expansion to some localities, such as those in Zulia and Anzoátegui, may be the result of natural dispersion of birds from already established Venezuelan populations.

The increase in the number of House Sparrows sightings in Venezuela over the last 10 years may be an indicator of population growth and expansion, or may reflect increasing number of birders and biologists able to properly identify the species. Some factors promoting House Sparrow expansion may include high productivity (McGillivray 1980), generalist feeding habits, foraging flocking behavior (Anderson 2006), and proclivity to novel foods and objects (Martin & Fitzgerald 2005). In Curaçao, House Sparrow expansion followed wet years at the end of the 1980s, after being restricted to an area of approximately 5 km for 20 years (de Boer 2008).

Research is needed to determine the factors that may favor expansion of the House Sparrow in Venezuela. A limiting factor may be the presence of Carib Grackles (*Quiscalus lugubris*), a common resident in northern and central Venezuela (Hilty 2003). Carib Grackles are generalists that forage opportunistically (Jaramillo & Burke 1999, Hilty 2003) making them very successful in urban areas, the typical habitat used by House Sparrows. Carib Grackles are also aggressive and larger, potentially restricting access by House Sparrows to resources (habitat and food) in urban areas.

The successful colonization by House Sparrows of urban and rural areas in Venezuela may reflect their ecological plasticity (Anderson 2006). House Sparrows are considered opportunistic foragers, and their diet includes a wide range of items, such as fruits, seeds of native plants and crops, insects, arachnids, crumbs, bread, and even nectar (Cink 1976, MacMillan 1981, Gavett & Wakeley 1986, Anderson 2006, Leveau 2008, Brzek et al. 2009). We found two reports of use of novel food resources in natural areas, namely fruits and seeds of two coastal trees. House Sparrows are secondary cavity nesters but they show high plasticity in nesting site use (Cink 1976). Our review indicated a certain dependence on the availability of man-made structures.

Even though most records of House Sparrows in Venezuela were from urban areas, the species has been reported in two protected natural areas. This may represent a unique opportunity for researchers to study the ecological interactions of House Sparrows and native avian communities. There is little information on the interactions between House Sparrows and members of Neotropical bird communities. MacGregor-Fors et al. (2010) indicated that House Sparrows altered diversity patterns of bird communities in western México. The authors reported richness and evenness of native avian communities were reduced in areas invaded by House Sparrows, whereas bird abundance was higher. House Sparrows may also affect individual species given their aggressive behaviors when competing for food resources or nesting sites. House Sparrows have been observed chasing and harassing other bird species to usurp their nests both in North America (Huber & Cope 1973, Werler & Franks 1975, Anderson 2006) and South America (Wagner 2012). There are also some reports of House Sparrows destroying eggs and killing nestlings and adults when competing for nests (Samuel 1969, Gowaty 1984, Baughman 2003). However, so far, we found no reports of negative impacts, aggressive behaviors or competition for nest sites of House Sparrows on native birds in Venezuela. Research is needed to assess the effect of this exotic species on the native avian communities of coastal Venezuela.

The House Sparrow appears to be expanding in Venezuela, but many information gaps remain regarding the biology of this species in the country. These include population dynamics, colonization routes, expansion rates, productivity and reproductive success, diet in natural areas, and most importantly, interactions with native birds. Long-term studies to fill these knowledge gaps are needed to assess the effects of this exotic species on local bird populations and native communities.

ACKNOWLEDGMENTS

We are deeply grateful to all the people that contributed information and photographs for this article (A. Porta, M. Vargas, B. Allegra, and C. Villalba). F.

Cavada and A. Cróquer provided valuable photographs and data from Los Roques Archipelago. We are really thankful to C. Bosque, F. Vilella, A. Weller, and K. Delhey for providing valuable suggestions on earlier versions of the manuscript.

REFERENCES

- Anderson, TR (2006) *Biology of the ubiquitous House Sparrow: from genes to populations*. Oxford Univ. Press, Oxford, UK.
- Azpiroz, A, D Ascanio, R Restall, A Soto, C Bosque & A Rodríguez-Ferraro (2006) Status and distribution of the House Sparrow (*Passer domesticus*) in Venezuela. *Ornitología Neotropical* 17: 457–460.
- Baughman, M (2003) *National Geographic Reference Atlas to the birds of North America*. National Geographic Society, Washington, D.C., USA.
- Brzek, P, K Kohl, E Caviedes-Vidal & WH Karasov (2009) Developmental adjustments of House Sparrow (*Passer domesticus*) nestlings to diet composition. *Journal of Experimental Biology* 212: 1284–1293.
- Cink, CL (1976) The influence of early learning on nest site selection in the House Sparrow. *Condor* 78: 103–104.
- de Boer, BA (2008) *Our birds: Curacao, Bonaire, Aruba*. 5th ed. Dieren Bescherming, Parera, Curaçao, The Netherlands.
- eBird (2015) *eBird: An online database of bird distribution and abundance (web application)*. Available at <http://www.ebird.org/> [Accessed 15 June 2015]
- Gavett, AP & JS Wakeley (1986) Diets of House Sparrows in urban and rural habitats. *Wilson Bulletin* 98: 137–144.
- Gowaty, PA (1984) House Sparrows kill Eastern Bluebirds. *Journal of Field Ornithology* 55: 378–380.
- Hilty, SL (2003) *Birds of Venezuela*. 2nd ed. Princeton Univ. Press, Princeton, New Jersey, USA.
- Huber, MR & JB Cope (1973) House Sparrow dispossesses nesting Eastern Kingbirds. *Wilson Bulletin* 85: 338–339.
- Jaramillo, A & P Burke (1999) *New World blackbirds: The icterids*. Princeton Univ. Press, Princeton, New Jersey, USA.
- Leveau, LM (2008) Dynamics of nectarivory in the House Sparrow in an urban environment. *Ornitología Neotropical* 19: 275–281.
- Levesque, A & P Clergeau (2002) First colonization of the Lesser Antilles by the House Sparrow *Passer domesticus*. *El Pitarre* 15: 73–74.
- MacGregor-Fors, I, L Morales-Pérez, J Quesada & JE Schondube (2010) Relationship between the presence of House Sparrows (*Passer domesticus*) and Neotropical bird community structure and diversity. *Biological Invasions* 12: 87–96.
- MacMillan, BWH (1981) Food of House Sparrows and Greenfinches in a mixed farming district, Hawke's Bay, New Zealand. *New Zealand Journal of Zoology* 8: 93–104.
- Martin, LB & L Fitzgerald (2005) A taste for novelty in invading House Sparrows, *Passer domesticus*. *Behavioral Ecology* 16: 702–707.
- McGillivray, WB (1980) Communal nesting in the House Sparrow. *Journal of Field Ornithology* 51: 371–372.
- Padrón López, Y & M Lentino (2013) Expansión de la distribución del Gorrión Común *Passer domesticus* en el norte de Venezuela. *Revista Venezolana de Ornitología* 3: 32–33.
- Raffaele, H, J Wiley, O Garrido, A Keith & J Raffaele (2003) *Birds of the West Indies*. Princeton Univ. Press, Princeton, New Jersey, USA.
- Ramoni-Perazzi, P, IA Soto-Werschitz & L Almeida (2007) First record of Variegated Flycatcher (*Empidonomus varius varius*) and further records of House Sparrow (*Passer domesticus*) in Los Roques Archipelago, Venezuela. *Journal of Caribbean Ornithology* 20: 47–49.
- Restall, R, C Rodner & M Lentino (2007) *Birds of Northern South America. An identification guide. Volume 1: Species accounts*. Yale Univ. Press, New Haven, Connecticut, USA.
- Reynolds, J & FG Stiles (1982) Distribución y densidad de poblaciones del Gorrión Común (*Passer domesticus*; Aves: Ploceidae) en Costa Rica. *Revista de Biología Tropical* 30: 65–71.
- Ridgely, RS & G Tudor (1989) *The birds of South America. The oscine passerines*. Univ. Texas Press, Austin, Texas, USA.
- Robbins, CS (1973) Introduction, spread, and present abundance of the House Sparrow in North America. *Ornithological Monographs* 14: 3–9.
- Samuel, DE (1969) House Sparrow occupancy of Cliff Swallow nests. *Wilson Bulletin* 81: 103–104.
- Sharpe, C, D Ascanio & R Restall (1997) Three species of exotic passerines in Venezuela. *Cotinga* 7: 43–44.
- Smith, NJH (1973) House Sparrow (*Passer domesticus*) in the Amazon. *Condor* 75: 242–243.
- Sullivan, BL, CL Wood, MJ Iliff, RE Bonney, D Fink & S Kelling (2009) eBird: a citizen-based bird observation network in the biological sciences. *Biological Conservation* 142: 2282–2292.
- Thurber, WA (1986) Range expansion of the House Sparrow through Guatemala and El Salvador. *American Birds* 40: 341–350.
- Torres, L & J Uzcátegui-Prieto (2014) Registros de reproducción del Gorrión Común *Passer domesticus* en el estado Zulia, Venezuela. *Revista Venezolana de Ornitología* 4: 28–30.
- Voous, KH (1985) Additions to the avifauna of Aruba, Curaçao, and Bonaire, South Caribbean. *Ornithological Monographs* 36: 247–254.
- Wagner, N (2012) Occupation of Monk Parakeet (*Myiopsitta monachus*) nest cavities by House Sparrows (*Passer domesticus*) in Rio Grande do Sul, Brazil. *Boletín SAO* 20: 72–78.
- Werler, E & EC Franks (1975) Some unusual nest sites of the House Sparrow. *Wilson Bulletin* 87: 113.

