

Urban Naturalist

No. 23

2019

Colonization of Hispaniola by *Margarops fuscatus* Vieillot (Pearly-eyed Thrasher)

Wayne J. Arendt, María M. Paulino, Luis R. Paulino, Marvin A. Tórréz, and Oksana P. Lane



The *Urban Naturalist* . . .

- ◆ A peer-reviewed and edited interdisciplinary natural history science journal with a global focus on urban areas (ISSN 2328-8965 [online]).
- ◆ Featuring research articles, notes, and research summaries on terrestrial, fresh-water, and marine organisms, and their habitats. The journal's versatility also extends to publishing symposium proceedings or other collections of related papers as special issues.
- ◆ Focusing on field ecology, biology, behavior, biogeography, taxonomy, evolution, anatomy, physiology, geology, and related fields. Manuscripts on genetics, molecular biology, anthropology, etc., are welcome, especially if they provide natural history insights that are of interest to field scientists.
- ◆ Offers authors the option of publishing large maps, data tables, audio and video clips, and even powerpoint presentations as online supplemental files.
- ◆ Proposals for Special Issues are welcome.
- ◆ Arrangements for indexing through a wide range of services, including Web of Knowledge (includes Web of Science, Current Contents Connect, Biological Abstracts, BIOSIS Citation Index, BIOSIS Previews, CAB Abstracts), PROQUEST, SCOPUS, BIOBASE, EMBiology, Current Awareness in Biological Sciences (CABS), EBSCOhost, VINITI (All-Russian Institute of Scientific and Technical Information), FFAB (Fish, Fisheries, and Aquatic Biodiversity Worldwide), WOW (Waters and Oceans Worldwide), and Zoological Record, are being pursued.
- ◆ The journal staff is pleased to discuss ideas for manuscripts and to assist during all stages of manuscript preparation. The journal has a mandatory page charge to help defray a portion of the costs of publishing the manuscript. Instructions for Authors are available online on the journal's website (www.eaglehill.us/urna).
- ◆ Co-published with the *Northeastern Naturalist* (Print ISSN # 1092-6194, Online ISSN # 1938-5307), the *Southeastern Naturalist* (Print ISSN # 1528-7092, Online ISSN # 1938-5412), and *Caribbean Naturalist* (ISSN # 2326-7119 [online]). Together these journals provide an integrated publishing and research resource for all of eastern mainland North America and the offshore waters and islands from Canada south to the Caribbean region, as well as urban areas worldwide.
- ◆ Available online in full-text version on the journal's website (www.eaglehill.us/urna). Arrangements for inclusion in the BioOne database (www.bioone.org, a collaborative effort of Allen Press, AIBS, et al.), EBSCOhost product line, and the Proquest Information and Learning databases (www.il.proquest.com) are being pursued.
- ◆ May be ordered through any major subscription service.

Cover Photograph: Male Pearly-eyed Thrasher (*Margarops fuscatus fuscatus*) perched on an iron gate, which is not a typical (natural) substrate. Photograph © Steven Tucker.

URBAN NATURALIST

Board of Editors

Myla Aronson, Rutgers University, New Brunswick, NJ, USA
Joscha Beninde, University of Trier, Trier, Germany
Andrea Larissa Boesing, Universidade Estadual de Londrina, Parana, Brazil
Sabina Caula, Universidad de Carabobo, Naguanagua, Venezuela
Sylvio Codella, Kean University, Union New Jersey, USA
Julie Craves, University of Michigan-Dearborn, Dearborn, MI, USA
Ana Faggi, Universidad de Flores/CONICET, Buenos Aires, Argentina
Leonie Fischer, Technical University of Berlin, Berlin, Germany
Keith Goldfarb, GoldRush Science Services, Steuben, ME, USA ... Editor-in-Chief
Chad Johnson, Arizona State University, Glendale, AZ, USA
Kirsten Jung, University of Ulm, Ulm, Germany
Madhusudan Katti, North Carolina State University, Raleigh, NC, USA
Erik Kiviat, Hudsonia, Bard College, Annandale-on-Hudson, NY, USA
Sonja Knapp, Helmholtz Centre for Environmental Research–UFZ, Halle (Saale), Germany ...
Managing Editor
David Krauss, City University of New York, New York, NY, USA
Mark Laska, Great Ecology, San Diego, CA, USA
Zdenka Lososova, Masaryk University, Brno, Czechia
Joerg-Henner Lotze, Eagle Hill Institute, Steuben, ME, USA ... Publisher
Kristi MacDonald, Hudsonia, Bard College, Annandale-on-Hudson, NY, USA
Ian MacGregor-Fors, Instituto de Ecología Mexico, Veracruz, Mexico
Tibor Magura, University of Debrecen, Debrecen, Hungary
Brooke Maslo, Rutgers University, New Brunswick, NJ, USA
Mark McDonnell, Royal Botanic Gardens Victoria and University of Melbourne, Melbourne, Australia
Mike McKinney, University of Tennessee, Knoxville, TN, USA
Desirée Narango, City University of New York, New York, NY, USA
Mitchell Pavao-Zuckerman, University of Arizona, Tucson, Arizona, USA
Joseph Rachlin, Lehman College, City University of New York, New York, NY, USA
Travis Ryan, Center for Urban Ecology, Butler University, Indianapolis, IN, USA
Michael Strohbach, Technische Universität Braunschweig, Institute of Geocology, Braunschweig, Germany
Katalin Szlavecz, Johns Hopkins University, Baltimore, MD, USA
Paige Warren, University of Massachusetts, Amherst, MA, USA
Jill Weber, Eagle Hill Institute, Steuben, ME, USA ... Production Editor
Alan Yeakley, Portland State University, Portland, OR, USA
Iriana Zuria, Universidad Autónoma del Estado de Hidalgo, Hidalgo, Mexico

The *Urban Naturalist* (ISSN # 2328-8965) is published by the Eagle Hill Institute, PO Box 9, 59 Eagle Hill Road, Steuben, ME 04680-0009. Phone 207-546-2821, FAX 207-546-3042. E-mail: office@eaglehill.us. Webpage: www.eaglehill.us/urna. Copyright © 2019, all rights reserved. Periodical postage paid in Steuben, ME and additional mailing offices. **Special issue proposals are welcome.** On-line secure subscription ordering: rate per year - \$20 regular, \$15 students, \$80 organizations. **Authors:** submission guidelines are available at www.eaglehill.us/urna. **Co-published journals:** The *Northeastern Naturalist* (ISSN 1092-6194 [print], ISSN 1938-5307 [online]), the *Southeastern Naturalist* (ISSN 1528-7092 [print], ISSN 1938-5412 [online]), and the *Caribbean Naturalist* (ISSN 2326-7119), journals with separate Boards of Editors. The Eagle Hill Institute is a tax exempt 501(c)(3) nonprofit corporation of the State of Maine (Federal ID # 010379899).

Colonization of Hispaniola by *Margarops fuscatus* Vieillot (Pearly-eyed Thrasher)

Wayne J. Arendt^{1,*}, María M. Paulino², Luis R. Paulino², Marvin A. Tórréz³, and
Oksana P. Lane⁴

Abstract - *Margarops fuscatus* (Pearly-eyed Thrasher) is the Caribbean's premier avian supertramp. Concurrent with urban development, it continues to expand its geographical and habitat range throughout the region, especially in the Greater Antilles. Through personal research, supplemented by relevant publications, unpublished results from others' research and casual observations, as well as checklists including Pearly-eyed Thrasher sightings submitted to Cornell University's eBird online database, we document the species' apparent colonization of Hispaniola. Most sightings of pioneering Pearly-eyed Thrashers in Hispaniola have been made by "eBirders" from coastal urban sites, particularly from resorts, hotels, and golf courses. Historical and contemporary evidence and the recent colonization of several islands in the northern Caribbean and The Bahamas, strongly suggest that the Pearly-eyed Thrasher may very well attempt to gain a foothold on the North American continent in the near future as a result of the effects of global climate change pursuant to natural and anthropogenic disasters and accelerated urban development in the USA and the Greater Caribbean Basin. Natural and human-influenced habitat alteration often culminates in a reduction in avian species richness, thus opening an avenue for colonization by this intrepid avian supertramp.

Introduction

There are 2 distinct and mutually exclusive life-history strategies in insular landbirds: (1) competitors and (2) colonizers. Island birds are either (1) highly competitive, k-selected ("high-S" or highly sedentary) species (MacArthur and Wilson 1967, Parry 1981) comprised of sustained populations of long-lived individuals living in stable environments that successfully compete for resources and produce few young, e.g., woodpeckers, parrots, and trogons; or (2) non-competitive, preeminent colonizers comprised of often short-lived individuals that produce numerous offspring throughout their lives, undergo exponential population growth, and populate ephemeral or disturbed environments, e.g., flycatchers, pigeons, and *Coereba flaveola* (L.) (Bananaquit). Most colonizers are generalists, especially in terms of food and habitat (Diamond 1974, 1975; Diamond and Marshall 1977a, 1977b; Horn and Rubenstein 1986; see also several additional and pertinent citations in Arendt

¹International Institute of Tropical Forestry, USDA Forest Service, Sabana Field Research Station, HC 02 Box 6205, Luquillo, PR 00773, USA. ²Grupo Acción Ecológico, Calle Gabriel García, No.105, Zona Colonial, Santo Domingo, Dominican Republic. ³Universidad Centroamericana (UCA), Instituto Interdisciplinario de Ciencias Naturales, Managua, Nicaragua. ⁴Biodiversity Research Institute, 276 Canco Road, Portland, ME 04103, USA. *Corresponding author - waynearendt@gmail.com.

2006). Colonizers are collectively known as “tramps”, namely, A-tramps, B-tramps, C-tramps, D-tramps, and supertramps (Diamond 1974). A-tramps are most closely affiliated ecologically with high-S species, whereas supertramps are the antithetical, prototypical colonizers. *Margarops fuscatus* Vieillot (Pearly-eyed Thrasher, hereafter also PETH or Pearly-eye) is the Caribbean’s premier supertramp (see Arendt 2006 and citations therein for more details).

By definition, although confined to species-poor islands and habitats, a supertramp possesses the innate ability to disperse over a wide geographic area. Not surprisingly, the PETH inhabits at least 80 islands and cays throughout the Greater Caribbean Basin, from Rum Cay and San Salvador in the Southern Bahamas south to Bonaire in the Netherlands Antilles and islands off the northern coast of South America (IUCN Red List 2018). Overall, the Pearly-eyed Thrasher has a north-south geographical range of more than 3000 km (Arendt 2006). Yet, with the exception of Puerto Rico, Pearly-eyes are noticeably absent from the larger, species-rich islands of the Greater Antilles such as Cuba, Jamaica, and (formerly) mainland Hispaniola, historically inhabiting only the smaller islands of the Lesser Antilles and the diminutive species-poor satellite islands in the Greater Antilles.

However, notwithstanding the previously documented range of the PETH, numerous fairly recent sightings on Hispaniola, mostly in coastal, urban areas (see Pearly-eyed Thrasher range map at: <http://www.eBird.org/>), testify to the fact that the PETH continues to expand its geographical and habitat range in the Greater Antilles. Like other mimids, e.g., *Mimus polyglottos* (L.) (Northern Mockingbird), that share a strong mutualistic bond with humans and their highly developed environs (David et al. 1990, Farnsworth et al. 2011, Stiles 1982), the Pearly-eyed Thrasher also flourishes in species-poor anthropogenic settings wherein interspecific and diffuse competition are significantly reduced and diverse food sources (often human introduced) abound (Arendt 2006). Urban centers and suburbia are favored by pioneering thrashers. Pearly-eyes are notorious for taking advantage of a wide variety of seeds, fruits, and their attendant insects found in cultured orchards, gardens, and ornamental plants dominating the landscape in urban settings, especially in and around golf courses, hotels and resort grounds (Arendt 2006, del Hoyo et al. 2005). Herein, our main objective is to document the Pearly-eyed Thrasher’s presence and apparent colonization of mainland Hispaniola and to chronicle the continued expansion of the Pearly-eyed Thrasher’s geographical and habitat range in the northern Caribbean, particularly the Turks and Caicos islands and the northern Bahamian islands, e.g., Great Exuma and New Providence.

Methods

Previous and contemporary avian research and casual observation on mainland Hispaniola

The authors, excluding O.P. Lane, have been surveying and banding birds throughout the Dominican Republic since 1976. As a Peace Corps volunteer assigned to the Santo Domingo Natural History Museum (1976–1978), W.J. Arendt and his Dominican counterpart, Tomás A. Vargas Mora, conducted audio-visual

surveys in a variety of habitats, from mangroves and thorn scrub to broadleaf and pine forests, throughout the Dominican Republic, multiple off-shore cays, and 2 nearby islands, Saona and Beata (see figure 1 in Arendt et al. [1979] for selected sites and geographical descriptions). In addition, they conducted mist-netting and banding operations in the city of Santo Domingo (1978, sector Gascue; #452 Avenida Bolívar: 18.46479°N, 69.92116°W) and surrounding pig farms, e.g., Engombe—see Arendt and Vargas (1984) for sites and geographical coverage. Other netting and banding sites and habitats included dry forest (southeastern peninsula, Saona Island, Monte Cristi), pine forest (Valle Nuevo National Park, Constanza), and mangrove forest near Sánchez, Samaná Bay, from 1981 to 1988 (see Arendt 1992 for a general description of habitat types). Since 1995, working as biological consultants for several local and international organizations, M.M. Paulino and later (in 2011) L.R. Paulino have been conducting surveys and mist-netting operations throughout the Dominican Republic: north—San Francisco de Macorís, Nagua, Puerto Plata, Bonao, Santiago, Jarabacoa; south—Pedernales, Barahona, Baní, Duvergé, Neiba, Jimaní, San Cristóbal, Azua; east—San Pedro de Macorís, Higüey, Miches, Hato Mayor, Sabana de la Mar, Samaná, Monte Plata; west—Monte Cristi, Santiago Rodríguez, Dajabón, Elías Piña, Valverde Mao; and urban areas—Santo Domingo, San Francisco de Macorís, Jarabacoa, San Pedro de Macorís, San Cristóbal, and Monte Plata.

All Pearly-eyed Thrasher sightings included in Appendix 1 constitute data retrieved from the “eBird” online data base except 3 temporally widely scattered records from 1984 (Chandler S. Robbins and Tomás A. Vargas Mora), 2014 (María Milagros Paulino, Kate Wallace, Danilo Mejilla), and 2016 (María Milagros Paulino). Checklist dates ranged from the earliest (1995) through July 2018 (Fig. 1; eBird 2012). Descriptions of the specific sites at which Pearly-eyed Thrashers were encountered are recorded textually (herein or cited publications) and visually (eBird Species Map) at Cornell University’s international eBird online database (Sullivan et al. 2009).

The banding site at which a single unknown molt cycle, basic plumaged (UCB) adult male Pearly-eyed Thrasher was (a) mist-netted (19 February 2017), (b) measured and weighed using dial calipers accurate to 0.02 mm and weighed with a 300-g spring scale with 0.05-g increments (Table 1), and (c) photographed (Fig. 2) was located within the Plaza de Cultura (sector Gascue) of Santo Domingo

Table 1. Morphometrics of an unknown molt cycle, basic plumaged (UCB) adult male Pearly-eyed Thrasher captured on 19 February 2017 within the Plaza de Cultura (Gascue sector) Santo Domingo, Dominican Republic. Body mass is measured in grams (g), longitudinal characters in millimeters (mm). The wing chord and body mass corroborate that this bird is a male and it hatched near sea level (Arendt 2006:figure 5.2). It was first observed on 8 October 2016 and singing on subsequent surveys in 2018.

Measurement	Culmen			Body mass	Wing Chord	Primary 9	Tarsus	Tail
	Length	Width	Depth					
Measurement	17.35	6.65	8.9	97	136	85	36.35	105

(18.47204°N, 69.90735°W). The capture of the adult male Pearly-eyed Thrasher was part of our ongoing (2014–present) USAID/DR–USDA Forest Service/IITF Santo Domingo ULTRA green area avian research project. From 2015 to present, we (W.J. Arendt, M.M. Paulino, L.R. Paulino) have been conducting avian point-counts associated with the US Forest Service *iTree* program (<https://www.itreetools.org/>). Some 80 avian count plots are distributed about equally among 4 sectors of Santo Domingo (Zona Colonial, San Carlos, Ciudad Nueva, Gascue).

In addition to our personal research and the inclusion of eBird sightings, to include a more comprehensive history of the Pearly-eye's presence (or absence) throughout Hispaniola, we gleaned pertinent information from published references (e.g., Keith et al. 2003; Latta et al. 2006; Woods and Ottenwalder 1983, 1986; see also Arendt 2006 for several additional sources) and asked fellow avian researchers and birders for pertinent information regarding their research studies and birding

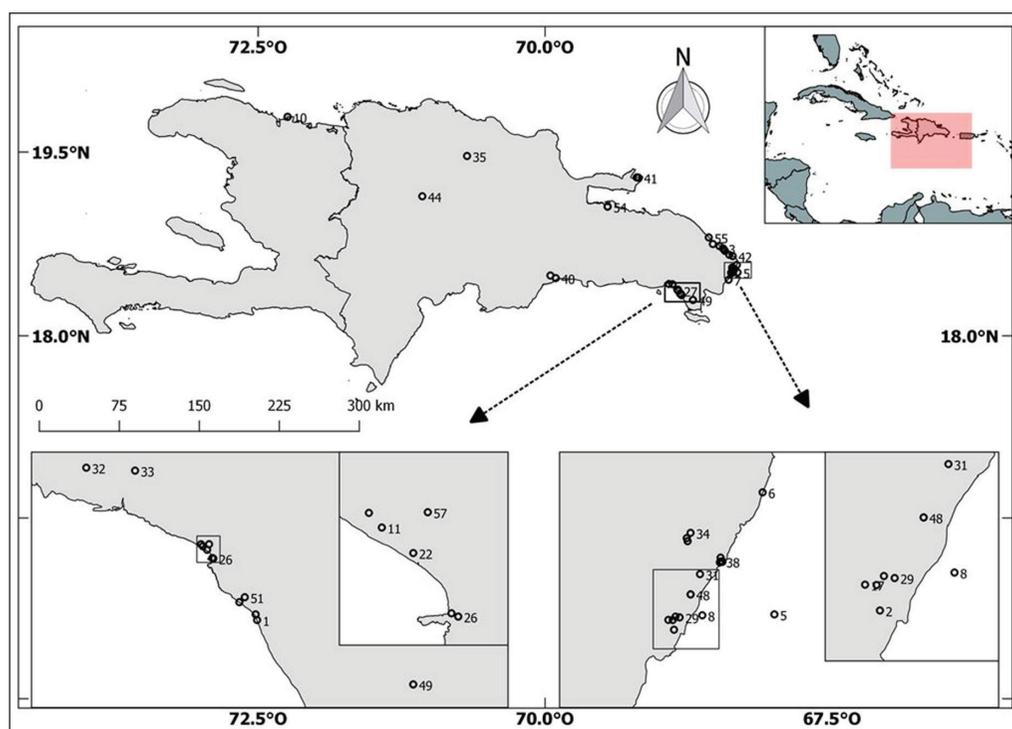


Figure 1. Map of Pearly-eyed Thrasher encounters (sightings and mist nettings) on mainland Hispaniola. Numbers refer to the geographical coordinates (latitude north and longitude west) of each encounter. See Appendix 1 and Table 2 for details.

Figure 2 (following page). Photos taken 19 February 2017 of an unknown molt cycle, basic plumaged (UCB) adult male Pearly-eyed Thrasher captured in a mist net within the Plaza de Cultura, Gascue sector, Santo Domingo, Dominican Republic. (A) In hand: Note the distinct, white malar streak, pronounced “chevrons” of the breast and the definitive white abdomen; (B) In tree: Note the previously mentioned characters, plus the extensive white on the underside of the rectrices (photos by Luis R. Paulino).



Figure 2. [Caption on preceding page.]

Table 2. Additional information pertaining to Pearly-eyed Thrasher (PETH) encounters (mist netting and reports by researchers, local residents and eBirders) on mainland Hispaniola: site reference points as shown in Figure 1, coordinates (latitude and longitude), time frame, source, number of persons reporting and thrashers observed. [Table continued on following page.]

Point	Latitude (°N)	Longitude (°W)	Month	Year	Date	Source	No. of	
							per.	PETH
1	18.332125	68.811647	3	1984	3 Feb 1984	Chandler S. Robbins, Tomás A. Vargas Mora	2	1
2	18.511109	68.376589	1	1995	23, 25 Jan 1995	Peter Adhemar	1	1
3	18.714509	68.450680	5	2003	28 May 2003	Andy & Mark Dettling	2	1
4	18.662961	68.394719	5	2003	30 May 2003	Andy & Mark Dettling	2	1
5	18.518777	68.323050		2003	20 Feb 2003	Olivier Langrand	1	4
6	18.579833	68.329333	11	2007	16 Nov 2007	Caribbean WorldBirds	1	1
7	18.458768	68.400879	11	2007	16 Nov 2007	Ted Goshulak	1	1
8	18.518317	68.361502	4	2008	26 Apr 2008	Tamie Bulow	1	1
9	18.493305	69.953930	6	2009	28 Jun 2009	Frank Bingham	2	1
10	19.785684	72.243433	1	2011	11 Jan 2011	Jim Zook	1	1
11	18.376535	68.846489	12	2011	4 Dec 2011	Gerry McChesney	2	2
12	19.786464	72.245128	12	2011	23–24 Dec 2011	Douglas Long	1	1
13	18.377745	68.847626	12	2011	29, 31 Dec 2011	Robert Hirst	1	2
14	18.556926	68.369808	1	2012	12 Jan 2012	Jeffrey Climie	1	2
15	18.515947	68.377265	1	2013	4, 6 Jan 2013	Mary Margaret Ferraro	1	1
16	18.528776	68.367741	1	2013	6 Jan 2013	Tim Healy, Mary M. Ferraro	2	1
17	18.516019	68.379593	1	2013	7 Jan 2013	Tim Healy	13	1
18	18.750533	68.538004	1	2013	12 Jan 2013	Mike V. A. Burrell	1	1
19	18.528775	68.367741	3	2013	31 Mar 2013	Byron Swift	1	1
20	18.545315	68.350794	5	2013	12 May 2013	Lisa Williams	1	2
21	18.547161	68.351738	5	2013	19, 22–24 May 2013	Pam Overmyer	1	2
22	18.374431	68.843722	11	2013	9, 13 Nov 2013	Kevin Hannah	2	1
23	19.292019	69.186915	11	2013	12–14 Nov 2013	Jorge Brocca	1	3
24	18.342883	68.823037	12	2013	2 Dec 2013	Freya Uvarova	3	1
25	18.335502	68.812566	12	2013	21 Dec 2013	Paul Pratt	4	2
26	18.369188	68.839774	1	2014	9 Jan 2014	Mary M. Ferraro	16	1
27	18.369460	68.840370	1	2014	9 Jan 2014	Wesley Hochachka	1	1
28	18.555421	68.369336	1	2014	10 Jan 2014	Sarah Dzielski	5	2
29	18.517275	68.373606	1	2014	16 Jan 2014	Sarah Dzielski	5	1
30	18.694708	68.432937	1	2014	22 Jan 2014	Andrey Vlasenko	1	1
31	18.694708	68.432937	5	2014	31 May 2014	María Paulino, Kate Wallace, Danilo Mejilla	3	2
32	18.538911	68.362727	8	2014	18 Aug 2014	Robert Parsons	1	1
33	18.423892	68.921254	3	2015	11 Mar 2015	John Sullivan	2	1
34	18.422124	68.889927	3	2015	14 Mar 2015	John Sullivan	2	1
35	18.559570	68.367770	3	2015	14 Mar 2015	Stephen Brauning	2	1
36	19.468028	70.680440	4	2015	29 Apr 2015	Chris Corcino	1	1
37	18.701537	68.437620	5	2015	25 May 2015	Eduardo Costoya	1	1

trips, e.g., time frame, locations, and any unpublished sightings they may have. Following, are summaries of research studies described by our colleagues:

Chris Rimmer, Kent P. McFarland, James Goetz and their associates at the Vermont Center for Ecostudies (VCE), conducted field studies on Hispaniola from 1984 to 2018, many of which involved presence/absence surveys and/or intensive demographic studies of *Catharus bicknelli* (Ridgway) (Bicknell's Thrush) throughout the Dominican Republic and in the La Selle and Macaya massifs of Haiti. More extensive protocols involved playback elicitation surveys of potential habitat, focusing on wet and mesic broadleaf forest. During all surveys, all other species were noted. Most surveys were conducted at mid- and high elevations, but some were conducted in low-elevation, wet, broadleaf forests (e.g., Parque Nacional Del Este, Los Haitises), including an urban site (Jardín Botánico Nacional). They also operated arrays of mist nets for short periods (usually 1–3 days) at a small number of sites during the course

Table 2, continued.

Point	Latitude (°N)	Longitude (°W)	Month	Year	Date	Source	No. of	
							per.	PETH
38	18.545074	68.350738	12	2015	12 Dec 2015	Geoffrey Groom	1	1
39	18.545208	68.351764	12	2015	25 Dec 2015	Isabel Apkarian	1	2
40	19.292693	69.188508	3	2016	27 Mar 2016	James Holdsworth	2	3
41	18.472040	69.907350	10	2016	8 Oct 2016	María Milagros Paulino	2	1
42	19.291844	69.188515	1	2017	19 Jan 2017	Daniel Gagné	1	1
43	18.652263	68.365302	1	2017	21 Jan 2017	Doris Guimond, Claude Gagnon	1	1
44	18.517659	68.375776	4	2017	13 Apr 2017	Marta Curti	2	1
45	19.139958	71.070344	7	2017	14 Jul 2017	Jonathan Oliveras	1	1
46	18.544834	68.352125	4	2017	15–22 Apr 2017	Scott Stafford	3	2
47	18.544835	68.352125	12	2017	10 Dec 2017	David Bernstein	1	5
48	19.056010	69.455190	1	2018	8 Jan 2018	John C Cobb, Julio Salgado	3	1
49	18.528776	68.367741	1	2018	9 Jan 2018	Ryan Larson	2	2
50	18.293294	68.711439	1	2018	16 Jan 2018	Simon Best	3	3
51	18.369189	68.839774	1	2018	17 Jan 2018	Robert Ruvolo	2	1
52	18.345854	68.819548	1	2018	20 Jan 2018	Daniel Gagné	1	1
53	18.714227	68.447406	1	2018	27 Jan 2018	Brian Menker	1	1
54	18.734276	68.481047	3	2018	4 Mar 2018	Justin Streit	1	1
55	19.056010	69.455190	3	2018	14 Mar 2018	Adam Winer	3	1
56	18.804631	68.573678	3	2018	15 Mar 2018	Elizabeth Geissler	1	2
57	18.293294	68.711439	3	2018	30 Mar 2018	John Hull	3	1
58	18.377801	68.842449	3	2018	31 Mar 2018	John Hull	1	1
59	19.293869	69.202616	6	2018	23–24 Jun 2018	Maximo Marcos Peña, Roca Eladio Fernández	2	1
60	19.056010	69.455190	7	2018	25 July 2018	Eric Baldo	1	1

of these extensive surveys (e.g., in Valle Nuevo, Los Haitises, Sierra de Neiba, Reserva Científica Ebano Verde, Loma Quita Espuela [LQE], Guaconejo, La Visite, Macaya). Some of these sites were sampled in just 1 winter (Valle Nuevo [Constanza], Los Haitises, Neiba, Guaconejo), whereas others were sampled during multiple winters (LQE, La Visite, Macaya). Intensive mid-winter mist netting and banding were carried out from 1995 to 2010 at 2 sites in the Sierra de Bahoruco (Pueblo Viejo and Palo de Agua; Lloyd et al. 2016). At both sites, arrays of nets were operated, and all resident birds were captured and banded during the avian breeding seasons of May 2005 and 2006 (Townsend et al., in press).

James Goetz, in addition to conducting extensive surveys for Bicknell's Thrush throughout the Dominican Republic (excluding the North West) and at all elevations (1997–2002), from 2008 to 2018 he birded many sites on the ~60-km La Selle Ridgeline chiefly above 1200 m in southeast Haiti, in the 3 national parks: La Visite, and Units 1 and 2 of Forêts des Pins.

Joseph M. Wunderle Jr. and Steven C. Latta carried out collaborative studies as part of a US Forest Service/IITF research project at mid- to high elevations in the La Vega Province of the Dominican Republic from 1992 to 1995 in coffee plantations and pine forest at multiple locations (Constanza, Ebano Verde, Manabao, and Jarabacoa).

Steven C. Latta, working for the National Aviary in Pennsylvania, has conducted personal research across the southern slope of the Sierra de Bahoruco, Pedernales Province, along a gradient from low-elevation thorn scrub to mid-elevation dry forest and high-elevation pine forest from 1996 to present, and in the La Joya, Duarte Province, at mid-elevation cacao plantations and riparian habitat from 2006 to present.

Sean Christensen, affiliated with the Université Lumière, has lived full-time in Cayes, Haiti, from January 2009 to the present. He has birded extensively in the following departments: du Sud, Grand-Anse, Nippes, Ouest, Sud-Est, Nord and Nord-Est (Plateau Central, Artibonite), including 2 excursions to Labadie on the northern coast. Habitats that Sean visited include urban (Port-au-Prince, Cap-Haïtien, Cayes, Jérémie, Carrefour), fertile plains (Les Cayes), mangrove forest, coastal, satellite islands (Île-à-Vache, Caye Ramier, Grosse Caye), mountain forest and mountain savanna-type habitat as well as xeric habitat.

Anderson Jean and Maxon Fildor, 2 Haitian-born birders and active members of the “Jeunes en Action pour la Sauvegarde de l'Ecologie”, have been studying and observing birds together in Haiti and the Dominican Republic since 2006. In Haiti, they have visited almost every area important to birds and most major habitats, including wetlands (Lagon aux Boeuf, and Baie de Mancenille in the northeast near Fort-Liberté; Trou Caïman, and Lac Azuéli in the west near Port-au-Prince; the Baie des Flamands, Étang Laborde, Étang Droite, and the Île-à-Vache mangroves in the south near Les Cayes) as well as dry forest in Belle-Anse and Anse-à-Pitres in the

southeast. At high elevations, they have visited all the remaining karst limestone cloud forest in the Massif de la Hotte (Morne Grand Bois, Morne Deux Mamelles, Morne Grande Colline, Macaya, Ti l'Étang [Department of Grande-Anse]) and in the Massif de La Selle (Morne La visite, Morne La Selle, Forêt des Pins). In the Dominican Republic, they have observed birds in the Ébano Verde Scientific Reserve (Constanza), Los Haitises, Loma El Alto de Canela, and the Sierra de Bahoruco mountains.

Spatial and numeric statistical analysis

We used R (R Core Team 2017) and its “adehabitatHR” package to estimate the Pearly-eyed Thrasher’s distribution throughout Hispaniola (Calenge 2006). We used the package MASS to correlate the number of eBird checklists with the number of new sightings. For the correlation, log-transformed data were entered into a linear generalized model and, after deriving the mathematical residuals, we evaluated the results of the model against the response variable (new checklists). The “adehabitatHR” package was originally designed to quantify home range (Calenge 2015), but in this instance, we used the Kernel UD model (UD = utilization distribution) considering “the use of space from a purely spatial point of view” (Calenge 2015:59), not taking time into account. Our analysis helps to visualize a thermal map of the locations through the probability of density, according to the coordinates (x, y).

Results

Pearly-eyed Thrasher presence–absence on mainland Hispaniola

Historically, information on the presence of the Pearly-eyed Thrasher on the main island of Hispaniola is scant and ambiguous. Avian specimen collectors and museum curators listed the species occurrence on Hispaniola in general terms only (see Arendt 2006:appendix 3 for more details). Contrarily, the contemporary history of the Pearly-eyed Thrasher’s presence or absence on Hispaniola has been documented in more detail, owing to more than 100 combined years of concerted effort on the part of researchers, birders, and casual observers throughout the Dominican Republic and Haiti. The Pearly-eyed Thrasher remained undetected during 2 years of ornithological surveys conducted in eastern Dominican Republic from 1974 to 1976 (Keith et al. 2003) and during 12 years of surveys (1976–1988) carried out by W.J. Arendt and T.A. Vargas Mora in all major habitat types, ranging from urban and coastal dry forest to remote broadleaf, pine, and mangrove forests throughout mainland Hispaniola, multiple off-shore cays and 2 nearby islands (Saona, Beata). Likewise, no Pearly-eyed Thrashers were captured or detected during 23 years (1995–present) of personal and collaborative avian surveys and mist-netting conducted by M.M. and L.R. Paulino in most habitats, including urban, in the Dominican Republic. Moreover, neither did several other avian researchers capture or otherwise detect Pearly-eyed Thrashers during their collective years of research and observations, e.g., 34 years (1984–2018) by the Vermont Center for Ecostudies Group (VCE), which conducted numerous studies in most habitats,

including urban, throughout the Dominican Republic and parts of Haiti; or during the 26 combined years (1992–2018) of collaborative and personal research carried out by J.M. Wunderle Jr. and S.C. Latta at their numerous study sites located along a coastal to highland elevational gradient encompassing most habitats in the Dominican Republic (sources: C.C. Rimmer, K. McFarland and J. Goetz, VCE, Vermont, USA, 2018 pers. comm.; J.M. Wunderle Jr., USFS/IITF, San Juan, PR, USA, and S.C. Latta, National Aviary, Pittsburgh, PA, USA, 2018 pers. comm.). In Haiti, no Pearly-eyed Thrashers were detected by Sean Christensen, a volunteer, regional reviewer for eBird, who has searched for birds in that country for almost a decade (2009–present). To date, he has observed 167 species in Haiti and has submitted 405 checklists to the online eBird data repository. (Sean Christensen, Universite Lumiere, Cayes, Haiti, 2018 pers. comm.). Likewise, Anderson Jean and Maxon Fildor have not encountered the Pearly-eyed Thrasher during their 12 years (2006–present) of studying and searching for birds in Haiti (A. Jean and M. Fildor, Jeunes en Action pour la Sauvegarde de l'Ecologie en Haïti [JACSEH], 2018 pers. comm.).

In modern times, the Pearly-eyed Thrasher was first documented on Hispaniola's "terra firma" in 1984 in dry forest within Parque Nacional Del Este in southeastern Dominican Republic when an individual was captured in a mist net set by C.S. Robbins and T.A. Vargas Mora (Wiley and Ottenwalder 1990). A small "resident" population was discovered in a large (2–3 km) patch of secondary scrub forest near Punta Cana in 1999 (Keith et al. 2003, Latta et al. 2006). Thereafter, commensurate with rapid urban development and the establishment of numerous resorts and vacation spots, particularly along the eastern and southeastern coasts (Fig. 1), Pearly-eyed Thrasher sightings increased substantially by 2013, especially near urban centers (Appendix 1; Figs. 1, 3) and in close vicinity of resorts, hotels,

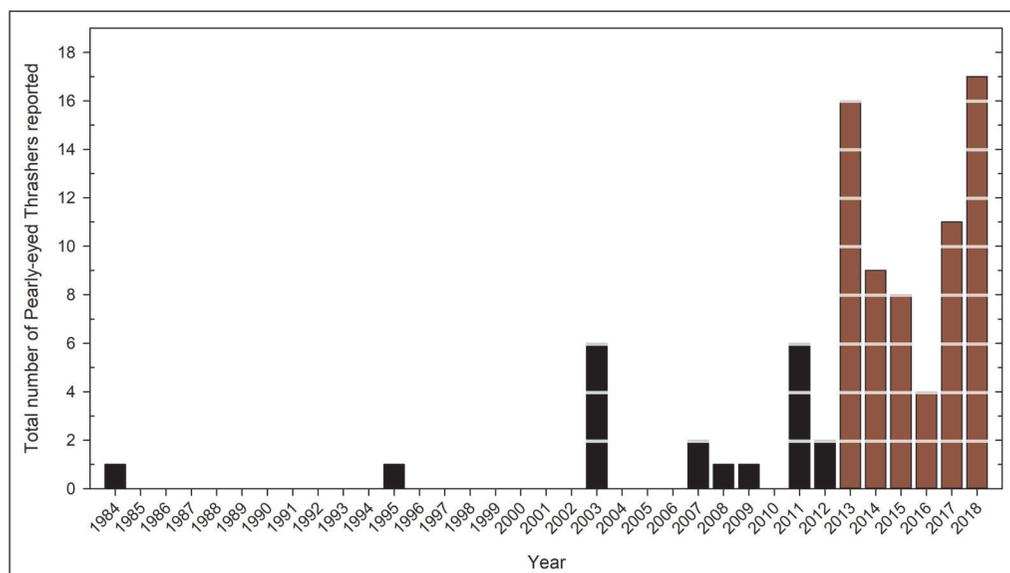


Figure 3. Total number of Pearly-eyed Thrashers reported (sightings and mist nettings) each year on mainland Hispaniola.

and adjacent manicured grounds, as well as heavily populated suburbs, especially in the Punta Cana area (Appendix 1; Figs. 1, 4, 5). By the year 2018, there was a positive correlation of new sites with the number of posted eBird checklists noting the Pearly-eyed Thrasher's continually increasing presence ($R^2 = 0.67$, $P = 0.0002$).

More than 100 people have documented the Pearly-eyed Thrasher's presence on mainland Hispaniola since 1984 (Appendix 1, Table 2). Two-thirds of the Pearly-

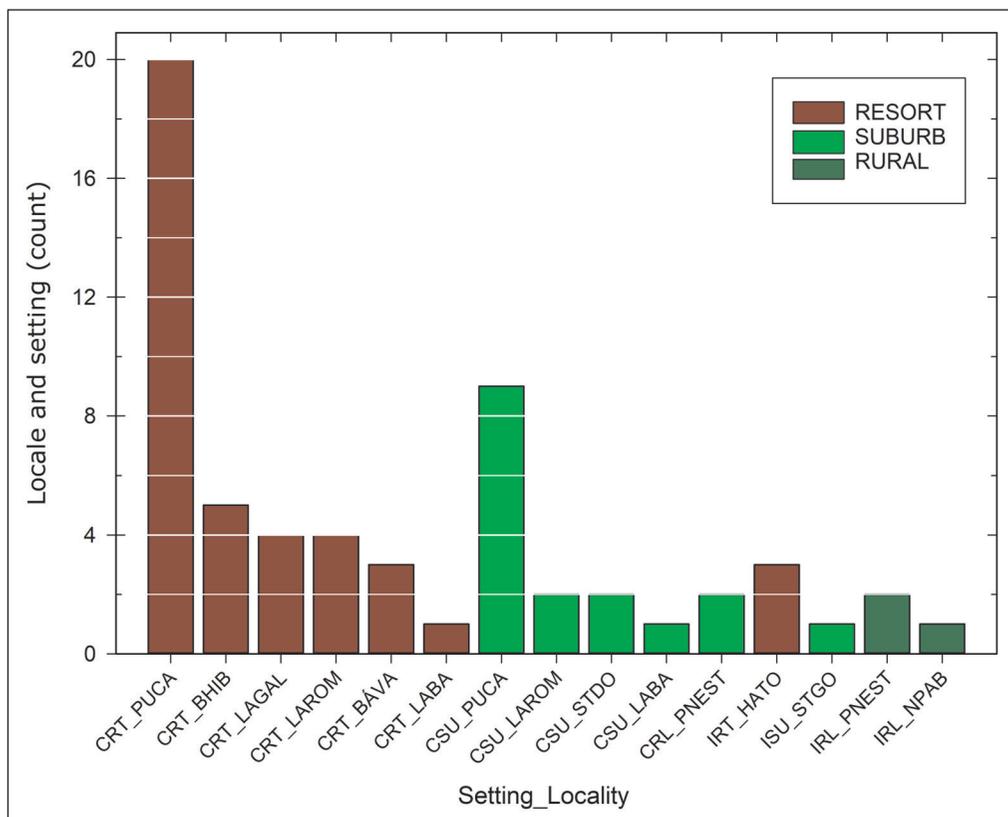


Figure 4. Counts of Pearly-eyed Thrasher encounters (sightings and mist nettings) by setting (defined as the nature of the surroundings and environment) and locale (geographical location). Settings: CRL (coastal rural; natural habitat); CRT (coastal resort; anthropically altered habitat; for all locales, this includes any combination of natural and manicured green habitat as well as gray habitat, e.g., cement, asphalt, stone and any other non-biotic material associated with hotels, restaurants, adjacent grounds, and all other affiliated infrastructure); CSU (coastal suburbs; a combination of natural and manicured green and gray habitat); IRL (interior rural; natural habitat); IRT (interior resort; a combination of natural and manicured green and gray habitat); and ISU (interior suburbs; a combination of natural and manicured green and gray habitat). Locales: BAVA (Bávaro, La Altagracia Province); BHIB (Bayahibe, La Romana Province); HATO (Mayor Province); LABA (Labadie, Haiti, Nord Department); LAGAL (Las Galeras, Samaná Province); LAROM (La Romana Province); NPAB (Parque Nacional Armando Bermúdez, Santiago Province); PNEST (Parque Nacional Del Este, La Altagracia Province); PUCA (Punta Cana, La Altagracia Province); STDO (Plaza de Cultura and Jardín Botánico, Santo Domingo city, Nacional, Distrito Nacional); STGO (Santiago city, Santiago Province).

eyed Thrasher sightings were from resorts and in the vicinity of hotels ($n = 40$), with only a third of the sightings originating from suburban or rural communities combined ($n = 20$). The difference was significant at $\alpha = 0.05$ (proportions test: $z = 2.078$, $P = 0.038$). Only 5 sightings were reported from rural areas, 2 from coastal sites within Parque Nacional Del Este, 2 recent (2018) records from the interior of Parque Nacional Del Este, and 1 in 2017 from Parque Nacional Armando Bermuda. Most sightings were made within the past 6 years, although there are 2 single records from 1984 and 1995 (Appendix 1, Table 2, Fig. 3). With the exception of September, Pearly-eyed Thrashers have been reported in every month of the year (Fig. 6). Sightings in November, December, and January ($n = 47$) and March, April, and May ($n = 27$) account for 74 of the conservative minimum of 85 total sightings and constitute 87% of all sightings (Fig. 6). Very few (or no) sightings were documented during other months, which, in total, constitute half of each year (February and June–October).

Potential points of entry onto mainland Hispaniola by the Pearly-eyed Thrasher

With the exception of a couple of sightings on the northern coast of Haiti, and thus the possibility of a northern point of entry in western Hispaniola from the Bahamas, the kernel UD model has derived a point of concentration at the far eastern end of mainland Hispaniola in 2 municipalities, La Altagracia and La Romana (Fig. 5). These 2 municipalities host important tourism areas such as Punta Cana and several sites in and around La Romana, among others, where resorts and beach destinations are the main attractions.

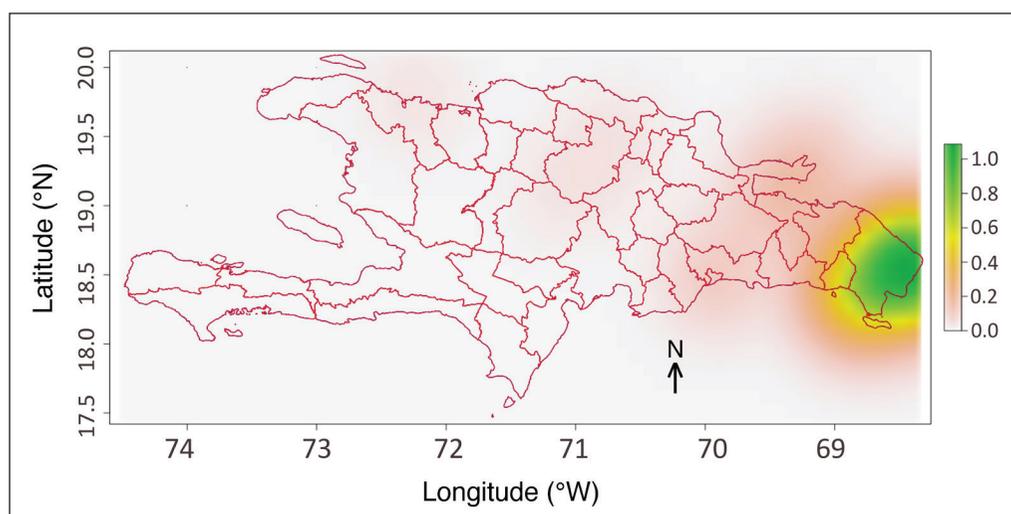


Figure 5. The Pearly-eyed Thrasher's probable point of entry onto mainland Hispaniola. The map is based on the division of the Dominican Republic's 31 provinces and Haiti's 10 departments, with longitude (west) and latitude (north) in decimal degrees. The legend to the right consists of an incremental scale and color scheme based on the probability of the Pearly-eyed Thrasher's occurrence, in which white is the probability of non-occurrence (0), gradually intensifying to a solid, dark green, the probability of occurrence of at least one individual (1).

Discussion

Pearly-eyed Thrasher presence–absence on mainland Hispaniola

In 1807, Vieillot listed the Pearly-eyed Thrasher as an inhabitant of “Saint-Dominique” (Hispaniola) and specifically stated observing the species in Haiti. Additionally, Cory (1891) listed the species from “San Domingo”, and Beebe listed it among 13 species from Haiti (Arendt 2006:appendix 3). However, the museum records of early field collectors are notoriously vague, incomplete, and sometimes incorrect. For example, Wetmore and Swales (1931) state that Beebe’s specimen had no information as to collection locality and was not listed by Beebe a year later in his birds of Haiti.

eBird Sightings are highly correlated with peaks in tourism

That most sightings of the Pearly-eyed Thrasher on Hispaniola are from popular tourist destinations during peak tourism seasons (November–January and March–May), attests to the fact that vacationing, international birders account for the majority of those documenting the Pearly-eye’s presence and apparent colonization of Hispaniola. However, sustained and growing populations must be evident before one can say with confidence that the Pearly-eyed Thrasher has successfully colonized Hispaniola and is an established breeding resident of the island.

Most thrashers photographed by “eBirders” were males (Appendix 1). Additionally, the single thrasher that the current authors banded February 2017 and

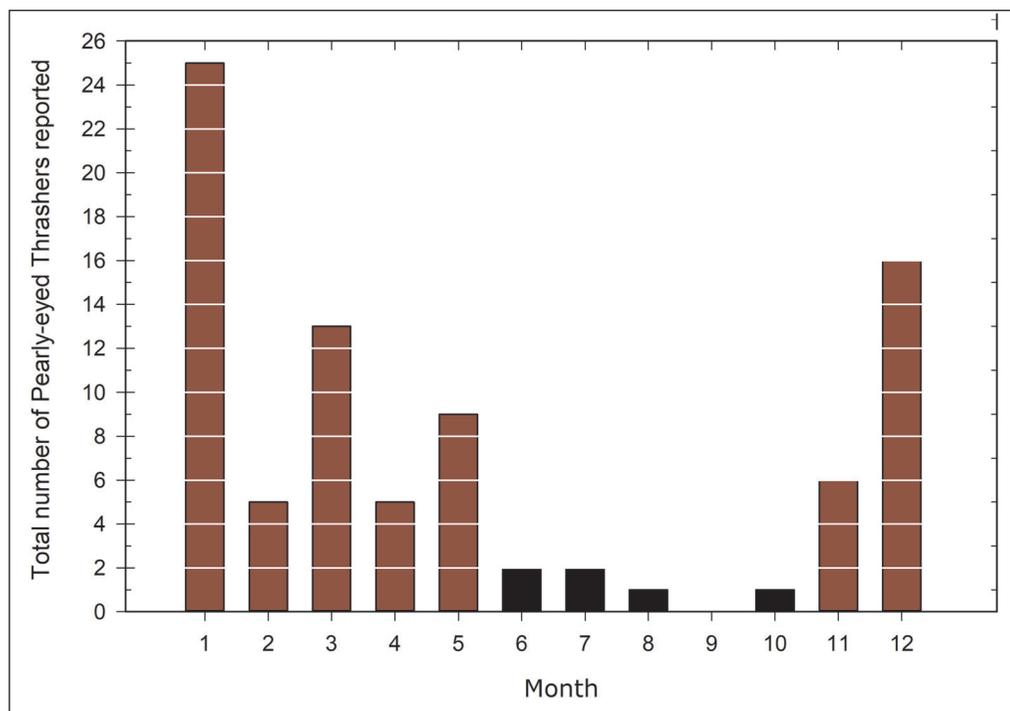


Figure 6. Total number of Pearly-eyed Thrashers reported (sightings and mist nettings) each month on mainland Hispaniola.

subsequently monitored (Table 1) was an adult male and, to date (September 2018), no female has been observed by our study group anywhere in the greater Santo Domingo area. The gender of the Pearly-eyed Thrasher observed in the Botanical Garden in 2009 was not reported (Appendix 1). Still, one study from Puerto Rico suggests that male Pearly-eyed Thrashers tend to disperse farther than females (Arendt 2006:figure 6.6). Additionally, the number of new sites where the Pearly-eyed Thrasher now occurs has increased concomitantly with the number of posted eBird checklists, but it is important to note that even though the number of new sites where the thrasher is now present has increased, the number of new municipalities where the bird now occurs has not increased in a similar fashion, reinforcing the fact most sightings are in municipalities dominated by tourism.

Despite the fact that most thrasher sightings originated from urban and suburban settings along the eastern and southern coasts of Hispaniola and vacation destinations frequented by local and international visitors alike, one must use discretion before concluding that the Pearly-eyed Thrasher is found only in, or even favors, anthropogenic habitats. Indeed, as outlined above, often the thrasher's optimal habitat on several islands throughout its extensive range is densely foliated stands of broadleaf forest at mid- to high elevations. What is needed now is a continued, concerted effort to search for the species throughout the island, especially the interior and more remote natural areas; that is, those areas in which the species has not been observed for at least two centuries or so, and as documented by the early literature and substantiated by several avian researchers, birders, and others over the past several decades of study and observation.

Potential points of entry onto mainland Hispaniola by the Pearly-eyed Thrasher

Punta Cana may very well be the initial point of entry by the Pearly-eyed Thrasher onto mainland Hispaniola. This notion is strongly supported by the fact that the first small "resident" population was discovered in the Punta Cana area in 1999 (Keith et al. 2003, Latta et al. 2006). Furthermore, the density of points in Figure 1 and the higher probability of occurrence in Figure 5 clearly demonstrate that the eastern portion of Hispaniola (where Punta Cana and other large resorts are located) is where there is a much higher expectation of observing the species on the main island, with a demonstrably reduced probability towards the center of the island. However, the authors expect sightings in rural and forested areas to increase as the propagule coastal populations disperse inland.

Attributes and inaptitudes of an avian supertramp

Why doesn't the Pearly-eye generally colonize and successfully compete on the larger islands of the Caribbean (and elsewhere in the region) or in species-rich habitats? Several inherent and extrinsic factors play key roles in the thrasher's noticeable absence in these situations. One major factor is diffuse (also deemed indirect or exploitation) competition (Arendt 2006, Schoener 1982), which is defined as any indirect conflict among species usually over obligatory resources such as food or nest sites (Diamond 1975, MacArthur et al. 1972). To its disadvantage, the Pearly-eye is a "jack-of-all-trades, master-of-none" generalist, particularly when

one considers its holistic diet and near lack of habitat preference. The thrasher eats a wide variety of foods and is found in all major habitats from sea level to mountain summit. Yet, within the relatively small, often restrictive habitats found throughout the thrasher's insular range, a high density of avian food and foraging specialists inhibits colonization by this generalist supertramp of species-rich large islands and habitats. Consequently, for several hundred years, diffuse competition along with interference competitive pressures, i.e., direct, physical, conflict often related to interspecific competition (Dondt 2012), may have kept the Pearly-eye from gaining a foothold on the once heavily forested, species-rich Hispaniola, which is the second largest island in the Caribbean and 7 times larger than Puerto Rico (Arendt 2006).

Disproving myths

Some argue that the Pearly-eyed Thrasher is an introduced or invasive species (CBT 2018), which is erroneous. It is a bona fide "natural" member of the Caribbean avifauna. The thrasher's presence in the Caribbean dates back more than 2000 years. The first evidence of the prehistoric occurrence of the Pearly-eyed Thrasher in the Caribbean comes from an archaeological site (subsequently destroyed by volcanism) located near Trant's Bay, Montserrat, in the Lesser Antilles (Steadman et al. 1984a). And fossilized bones of the Pearly-eye have been found in late Holocene deposits from the Burma Quarry, Antigua, Lesser Antilles (Pregill et al. 1988, Steadman et al. 1984b). Both discoveries confirm the thrasher has been in the region and at least proximate to the Greater Antilles for millennia. L.J.P. Vieillot (1807—corrected date 1808; Browning and Monroe 1991) collected the type specimen of the Pearly-eyed thrasher in Puerto Rico. The type specimen remains in the Vieillot collection at the Musée de Histoire Naturelle in Paris.

Many associate the Pearly-eyed Thrasher with only ephemeral, disturbance-related habitats and human-induced altered lands, e.g., habitats impacted by extreme weather events and anthropic development, because Pearly-eyes are commonly observed, and thrive, in such situations. But in addition to its urban disposition, as a habitat generalist, inhabiting several high-relief islands throughout the Caribbean, the Pearly-eyed Thrasher is frequently the most abundant landbird in the densest stands of broadleaf forest at mid- to high elevations, often comprising up to 60% (relative abundance) of the captures at high elevations in closed-canopy wet forest (Arendt 2006:chapter 4, figure 4.4). Moreover, on Tortola (British Virgin Islands), the Pearly-eye is most abundant in coconut plantations and also at mid- to high elevations, where it is the most numerous landbird in the taller, denser vegetation (Arendt 2006, Mirecki et al. 1977). It even frequents and breeds in bamboo stands in Puerto Rico (Arendt 2006).

Supertramp attributes enhanced through natural and human-induced disturbances

The Pearly-eye's future as a species depends on its ability to adapt to the ever-changing conditions in natural and anthropogenic environments. The Pearly-eyed Thrasher's fairly recent stronghold on mainland Hispaniola and its apparent ongoing colonization attempt of Hispaniola mirrors that of its earlier promulgation

throughout the main island of nearby Puerto Rico in response to that island's ever-increasing urban development. For more than a century, Pearly-eyes were scarce and only patchily distributed in the lowlands and foothills of Puerto Rico. However, by the 1920s, resident biologists noted a steady increase in thrasher numbers throughout the island. By the 1950s, thrasher populations had burgeoned and virtually covered the island, to elevations of several hundred meters in the Sierra de Luquillo mountains in the northeast (Arendt 2006:68). Arguably, urban development augmented thrasher populations by creating a plethora of food resources and nest sites for prospecting thrashers undergoing ecological release and niche expansion in a less competitive environment, resulting from reduced interspecific competition. In urban settings, there are fewer species and fewer individuals of each species with whom the Pearly-eye must compete for the vital resources necessary for survival (Arendt 2006:chapter 4).

Climate change as the catalyst for a supertramp's potential foothold in North America

As the Supertramp Theory predicts (Diamond 1974), Pearly-eyed Thrasher numbers will increase immediately following disturbance in areas devastated by natural and anthropogenic disasters such as hurricanes, prolonged droughts, deforestation, and urban development. Owing to the mounting effects of global climate change such as increasing number and frequency of heat waves, droughts, heavy precipitation and diluvial downpours, floods, deadly hurricanes, and extreme cyclonic events on a global scale, in the Greater Caribbean Basin and the Gulf of Mexico (Donnelly and Woodruff 2007, Emanuel 2005, Goldenberg et al. 2001, Lugo 2008, NCA 2014), coupled with ever-increasing urban development throughout the region but notably rampant in the northern Caribbean (Arendt 2006: chapter 4, Stenseth et al. 2015) and principally in The Bahamas, it is only a matter of time (and a very short time) before the Pearly-eyed Thrasher reaches the mainland of the United States. Currently, Pearly-eyes are frequently sighted on Nassau and Great Abaco (eBird 2012), both fewer than 300 km from Miami, FL, USA. Once the thrasher reaches Grand Bahama, it is less than a 200-km trek to the US mainland. The growing number of severe cyclonic events laying waste to natural habitats and destroying the metropolitan areas of Florida and other southeastern states will exponentially increase the Pearly-eye's chances of a successful colonization of the USA mainland in the near future.

Acknowledgments

We thank our colleagues and international birders who have kindly shared their unpublished information and, in particular, Chris Rimmer (VCE) for supplying contact information for additional birders, especially in Haiti; and Kent McFarland (VCE and eBird filter manager for Hispaniola) for ensuring we found all Pearly-eyed Thrasher eBird sightings through July 2018. We also thank the many "ebirders" who submitted checklists of their Pearly-eyed Thrasher sightings to eBird.org/, as well as Cornell University and its staff for creating the eBird platform and managing it online, thus, making it accessible to the world. We thank Editor Sabina Caula and the 3 anonymous reviewers for their constructive comments.

We especially thank Jerry Bauer, International Cooperation Program Manager, of the US Forest Service International Institute of Tropical Forestry (USFS-IITF) for technical, administrative and logistical support, and the US Agency for International Development/Dominican Republic for financial support through a Participation Agency Program Agreement (PAPA-AEG-T-00-07-00003) with the USFS-IITF.

Literature Cited

- Arendt, W.J. 1992. Status of North American migrant landbirds in the Caribbean: A summary. Pp. 143–171, *In* J.M. Hagan III and D.W. Johnson (Eds.). Ecology and Conservation of Neotropical Migrant Landbirds. Smithsonian Institution Press, Washington, DC, USA.
- Arendt, W.J. 2006. Adaptations of an avian supertramp: Distribution, ecology, and life history of the Pearly-eyed Thrasher (*Margarops fuscatus*). General Technical Report 27. Department of Agriculture, Forest Service, International Institute of Tropical Forestry. San Juan, PR, USA. 404 pp.
- Arendt, W.J., and T.A. Vargas Mora. 1984. Range expansion of the Shiny Cowbird in the Dominican Republic. *Journal of Field Ornithology* 55:104–107.
- Arendt, W.J., T.A. Vargas Mora, and J.W. Wiley. 1979. White-crowned Pigeon: Status range-wide and in the Dominican Republic. *Proceedings of the Annual Conference of the Southeastern Association of Fish and Game Agencies* 33:111–122.
- Browning, M.R., and B.L. Monroe Jr. 1991. Clarifications and corrections of the dates of issue of some publications containing descriptions of North American birds. *Archives of Natural History* 18:381–405.
- Calenge, C. 2006. The package adehabitat for the R software: A tool for the analysis of space and habitat use by animals. *Ecological Modelling* 197:516–519.
- Calenge, C. 2015. Home-range estimation in R: The adehabitatHR package. Available online at: <https://cran.r-project.org/web/packages/adehabitatHR/vignettes/adehabitatHR.pdf>. Accessed 10 August 2018.
- Caribbean Birding Trail (CBT). 2018. Ecological Foundation Trail, Punta Cana. Available online at <http://www.caribbeanbirdingtrail.org/sites/dominican-republic/southeast-and-los-haitises/ecological-foundation-trail-punta-cana/>. Accessed 16 July 2018.
- David, N., M. Gosselin, and G. Seutin. 1990. Pattern of colonization by the Northern Mockingbird in Québec. *Journal of Field Ornithology* 61:1–8.
- del Hoyo, J., A. Elliott and D. Christie (Eds.). 2005. *Handbook of the Birds of the World*. Lynx Ediciones, Barcelona, Spain. 895 pp.
- Diamond, J.M. 1974. Colonization of exploded volcanic islands by birds: The supertramp strategy. *Science* 184:803–806.
- Diamond, J.M. 1975. Assembly of species communities. Pp. 342–444, *In* M.L. Cody and J.M. Diamond (Eds.). *Ecology and Evolution of Communities*. Belknap Press, Cambridge, MA, USA.
- Diamond, J.M., and A.G. Marshall. 1977a. Distributional ecology of New Hebridean birds: a species kaleidoscope. *Animal Ecology*. 46:703–727.
- Diamond, J.M., and A.G. Marshall. 1977b. Niche shifts in New Hebrides birds. *Emu*. 77:61–72.
- Dhondt, A.A. 2012. *Interspecific competition in birds*. Oxford Avian Biology Series. Oxford University Press, Oxford, UK. 260 pp.
- Donnelly, J.P., and J.D. Woodruff. 2007. Intense hurricane activity over the past 5000 years controlled by El Niño and the West African monsoon. *Nature* 447:465–468.

- eBird. 2012. eBird: An online database of bird distribution and abundance. Ithaca, NY, USA. Available online at: <http://www.ebird.org>. Accessed 24 November 2017 and 14 July 2018.
- Emanuel, K. 2005. Increasing destructiveness of tropical cyclones over the past 30 years. *Nature* 436:686–688.
- Farnsworth, G., G.A. Londono, J.U. Martin, K.C. Derrickson, and R. Breitwisch. 2011. Northern Mockingbird (*Mimus polyglottos*), version 2.0. No. 7, *In* P.G. Rodewald (Ed.). *The Birds of North America*. Cornell Lab of Ornithology, Ithaca, NY, USA. Available online at <https://doi.org/10.2173/bna.7>. Accessed 25 December 2017.
- Goldenberg, S.B., C.W. Landsea, A.M. Mestas-Núñez, and W.M. Gray. 2001. The recent increase in Atlantic hurricane activity: Causes and implications. *Science* 293:474–479.
- Horn, H.S., and D.I. Rubenstein. 1986. Behavioral adaptations and life history. Pp. 279–300, *In* J.R. Krebs and N.B. Davies (Eds.). *Behavioral Ecology*. 2nd Edition. Blackwell Scientific, Oxford, UK.
- IUCN Red List. 2018. Pearly-eyed Thrasher (*Margarops fuscatus*). Available online at <http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22711147A94280625.en>. Accessed 16 July 2018.
- Keith, A.R., J.W. Wiley, S.C. Latta, and J.A. Ottenwalder. 2003. *The Birds of Hispaniola: Haiti and the Dominican Republic. An annotated checklist*. British Ornithologists' Union, British Ornithologists' Club, Tring, Herts, UK. 293 pp.
- Latta, S., C. Rimmer, A. Keith, J. Wiley, H. Raffaele, K. McFarland, and E. Fernández. 2006. *Birds of the Dominican Republic and Haiti*. Princeton University Press, Princeton, NJ, USA.
- Lloyd, J.D., C.C. Rimmer, and K.P. McFarland. 2016. Assessing conservation status of resident and migrant birds on Hispaniola with mist-netting. *PeerJ* 3:e1541. Available online at <https://doi.org/10.7717/peerj.1541>. Accessed 16 July 2018.
- Lugo, A.E. 2008. Visible and invisible effects of hurricanes on forest ecosystems: An international review. *Austral Ecology* 33:368–398.
- MacArthur, R.H., and E.O. Wilson. 1967. *The Theory of Island Biogeography*. Princeton University, Princeton, NJ, USA.
- MacArthur, R.H., J.M. Diamond, and J.R. Karr. 1972. Density compensation in island faunas. *Ecology* 53:330–342.
- Mirecki, D.N. J.M. Hutton, C.M. Pannell, T.J. Stowe, and R.W. Unite. 1977. *Report of the Cambridge ornithological expedition to the British Virgin Islands 1976*. Churchill College, Cambridge, UK. 44 pp.
- National Climate Association (NCA) 2014. Extreme weather. Available online at <https://nca2014.globalchange.gov/highlights/report-findings/extreme-weather>. Accessed 3 September 2018.
- Parry, G.D. 1981. The meanings of r- and K-selection. *Oecologia* 48:260–264.
- Pregill, G.K., D.W. Steadman, S.L. Olson, and F.V. Grady. 1988. Late Holocene fossil vertebrates from Burma Quarry, Antigua, Lesser Antilles. *Smithsonian Contributions to Zoology* 463:1–27.
- R Core Team. 2017. *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. Available online at <https://www.R-project.org/>. Accessed 10 August 2018.
- Schoener, T.W. 1982. The controversy over interspecific competition. *American Scientist* 70:586–595.
- Steadman, D.W., D.R. Watters, E.S. Reitz, and G.K. Pregill. 1984a. Vertebrates from archaeological sites on Montserrat, West Indies. *Annals of the Carnegie Museum* 53:1–29.

- Steadman, D.W., G.K. Pregill, and S.L. Olson. 1984b. Fossil vertebrates from Antigua, Lesser Antilles: evidence for late Holocene human-caused extinctions in the West Indies. *Proceedings of the National Academy of Sciences, USA* 81:4448–4451.
- Stenseth, N.C., J.M. Durant, M.S. Fowler, E. Matthysen, F. Adriaensen, N. Jonzén, K.-S. Chan, H. Liu, J. De Laet, B.C. Sheldon, M.E. Visser, and A.A. Dhondt. 2015. Testing for effects of climate change on competitive relationships and coexistence between two bird species. 2015. *Proceedings of the Royal Society, Series B* 282:20141958. available online at: <http://dx.doi.org/10.1098/rspb.2014.1958>. Accessed 17 July 2018.
- Stiles, E.W. 1982. Expansions of Mockingbird and Multiflora Rose in the northeastern United States and Canada. *American Birds* 36:358–364.
- Sullivan, B.L., C.L. Wood, M.J. Iliff, R.E. Bonney, D. Fink, and S. Kelling. 2009. eBird: A citizen-based bird observation network in the biological sciences. *Biological Conservation* 142:2282–2292.
- Townsend, J.M., C.C. Rimmer, S.C. Latta, D. Mejia, E. Garrido Gomez, and K.P. McFarland. In press. Nesting ecology and nesting success of resident and endemic tropical birds in the Dominican Republic. *Wilson Journal of Ornithology*.
- Wetmore, A., and B.H. Swales. 1931. The birds of Haiti and the Dominican Republic. *US National Museum Bulletin*. 155:1–483.
- Wiley, J.W., and J.A. Ottenwalder. 1990. Birds of Islas Beata and Alto Velo, Dominican Republic. *Studies on Neotropical Fauna and the Environment* 25:65–88.
- Wolfe, J.D., T.B. Ryder, and P. Pyle. 2010. Using molt cycles to categorize the age of tropical birds: An integrative new system. *Journal of Field Ornithology* 81:186–194.
- Woods, C.A., and J.A. Ottenwalder. 1983. The montane avifauna of Haiti. Pp. 607–622, *In* A.C. Risser Jr and F.S. Todd (Eds). *Proceedings of the Jean Delacour/IFCB symposium on breeding birds in captivity*. International Foundation for the Conservation of Birds, Los Angeles, CA, USA.
- Woods, C.A., and J.A. Ottenwalder. 1986. Birds of the national parks of Haiti (The birds of Parc National La Viste and Parc National Pic Macaya, Haiti). USAID/Haiti, Contract Number 521-0169-C-00-3083-00. Gainesville, FL, USA. 241 pp.

Appendix 1. Summary of Pearly-eyed Thrasher encounters (mist netting and reports by researchers, local residents, and eBirders) on mainland Hispaniola, including location, habitat (rural or urban), date, number reported (some with notes), and source. Numbers of individuals observed are the totals (or “minimum” totals) mist-netted, sighted, or entered in eBird checklist. Some eBirders, rather than quantifying the total number of individuals detected, simply placed an “X” in their checklist. Location and setting, i.e. the place or type of surroundings and environment): CRL (coastal rural); CRT (coastal resort: “resort” for all locales includes hotels, restaurants, adjacent grounds, and associated settings); CSU (coastal suburbs); IRL (interior rural); ISU (interior suburbs)

Location and habitat	Date	Number reported and (notes)	Source
Haiti			
Labadie (Nord) (CSU)	12 November 2011	1	Douglas Long
Labadie (CRT) (Cap-Haitien)	11 January 2011	1 (“6 in trees behind hut where they outfit and orient people for cable slide ...”)	Jim Zook
Dominican Republic			
Hato Mayor (Paraiso Caño Hondo) (IRT)	25 July 2018	1 (“calling extensively”)	Eric Baldo
Samaná (Las Galeras) (CRT) (El Pelicano Apart-Hotel)	23–24 June 2018	1 (heard singing in mango tree)	Maximo Marcos Peña Roca, Eladio Fernández)
La Romana Dreams La Romana Resort (CRT)	31 March 2018	1	John Hull
Parque Nacional Del Este (IRL)	30 March 2018	1	John Hull
Punta Cana Dreams Resort (CRT)	15 March 2018	2	Elizabeth Geissler
Hato Mayor (Paraiso Caño Hondo) (IRT)	14 March 2018	1 (“2 seen prior day at hotel; this individual along the creek.”)	Adam Winer
Punta Cana Hard Rock Hotel (CRT)	4 March 2018	1 (photo of adult female, UCB)	Justin Streit
Punta Cana Bávaro Beach (CRT)	27 January 2018	1	Brian Menker
La Romana Dreams Dominicus (CRT)	20 January 2018	1	Daniel Gagné
Bayahibe (Parqueo Principal) (CRT)	17 January 2018	1	Robert Ruvolo
Parque Nacional Del Este (IRL)	16 January 2018	3	Simon Best
Punta Cana Resort and Club (CRT)	9 January 2018	2	Ryan Larson
Hato Mayor (Paraiso Caño Hondo) (IRT)	8 January 2018	1	John Cobb, Julio Salgado
Punta Cana (Club Med) (CRT)	10 December 2017	5	David Bernstein

W.J. Arendt, M.M. Paulino, L.R. Paulino, M.A. Tórréz, and O.P. Lane

Location and habitat	Date	Number reported and (notes)	Source
Parque Nacional Armando Bermúdez (IRL)	14 July 2017	1	Jonathan Oliveras
Punta Cana (Club Med) (CRT)	15–22 April 2017	2 (min.) (photos 16, 19, 22 April)	Scott Stafford (party of 3, 20 April)
	16 April: UCB ^A male;		
	19 April: UCB male;		
	22 April: FCF male (singing)		
Punta Cana Ecological Found. (CSU) (Animal Farm)	13 April 2017	1	Marta Curti
Punta Cana (Blau Natura Park) (CRT)	21 January 2017	1	Doris Guimond and Claude Gagnon
Samaná (Las Galeras) (CRT)	19 January 2017	1 (wooded area ~100 m SE of the Grand Paradise Resort)	Daniel Gagné
(but only a photo of 1 individual)			
Santo Domingo Plaza de la Cultura (CSU)	8 October 2016	1	María Milagros Paulino
Samaná Peninsula (Las Galeras) (CRT) (Amsha Marina and Resort)	27 March 2016	3 (photo of one individual) (adult female, UCB)	James Holdsworth
Punta Cana (Club Med) (CRT)	25 December 2015	2 (“a pair seen together”) (photo of immature female, SCF)	Isabel Apkarian
Punta Cana (Club Med) (CRT)	12 December 2015	1	Geoffrey Groom
Bávaro (Barceló Palace Deluxe) (CRT)	27 May 2015	1	Eduardo Costoya
Santiago (Intellisys Corporation) (ISU)	29 April 2015	1	Chris Corcino
Punta Cana Village (CSU) (near Punta Cana International Airport)	14 March 2015	1	Stephen Brauning
La Romana Altos de Chavón (CSU)	14 March 2015	1 (photo of adult male, UCB)	John Sullivan
La Romana 31 Barranca (CSU) (golf cart from hotel to Altos de Chavón)	11 March 2015	1	John Sullivan

Location and habitat	Date	Number reported and (notes)	Source
Punta Cana (CRT)	18 August 2014	1	Robert Parsons
Punta Cana (CRT)	31 May 2014	2	María Paulino, Kate Wallace, Danilo Mejilla
Bávaro Grand Palladium Hotel (CRT) (Playa del Cortecito)	22 January 2014	1 (“observed near a restaurant”)	Andrey Vlasenko
Punta Cana Resort and Club (CSU) (Forest Patch)	16 January 2014	1 (2 photos: adult male, UCB)	Sarah Dzielski
Punta Cana Village (CSU)	10 January 2014	2	Sarah Dzielski
Bayahibe (n. harbour restaurant) (CRT)	9 January 2014	1 (eBird “Breeding Code P”: “Pair in Suitable Habitat”) (“Probable”)	Wesley Hochachka
Bayahibe (Parqueo Principal) (CRT)	9 January 2014	1 (“seen...in tree above restaurant”)	Mary M. Ferraro
Parque Nacional Del Este (CRL)	21 December 2013	2	Paul Pratt
Bayahibe Playa Dominicus (CRT) (Catalonia Gran Dominicus)	2 December 2013	1 (“along beach trail near park [HQ]”)	Freya Uvarova
Samaná Grand Paradise Beach Res. (CRT) (Playa del Aserradero Las Galeras)	12–14 November 2013	3 (min.)	Jorge Brocca
Bayahibe (CRT)	9, 13 November 2013	1 (min.) (photo: immature, sex? ^B)	Kevin Hannah
Punta Cana Club Med (CRT)	19, 22–24 May 2013	2 (min.) (“seen at 2...locations in [the] resort.”)	Pam Overmyer
Punta Cana Club Med (CRT)	12 May 2013	2 (“in dense shrubs around resort”)	Lisa Williams
Punta Cana Resort and Club (CSU)	31 March 2013	X	Byron Swift
Rancho Punta Cana Boogie (CRT)	12 January 2013	1	Mike V.A. Burrell
Punta Cana Ecological Found. (CSU)	7 January 2013	1	Tim Healy
Punta Cana Resort and Club (CRT)	6 January 2013	1	Tim Healy and Mary M. Ferraro

W.J. Arendt, M.M. Paulino, L.R. Paulino, M.A. Tórrrez, and O.P. Lane

Location and habitat	Date	Number reported and (notes)	Source
Punta Cana Ecological Found. (CSU)	4, 6 January 2013	1 (min.)	Mary Margaret Ferraro
Punta Cana Village (CSU)	12 January 2012	2 (min.) (near Punta Cana International Airport)	Jeffrey Climie
La Romana Dreams Hotel (CRT)	29, 31 December 2011	2 (min.) (2 nd day) “2 birds in close vicinity squabbling”)	Robert Hirst
La Romana Dreams Resort (CRT) (Playa Bayahibe)	4 December 2011	2 (“along nature trail...”)	Gerry McChesney
Santo Domingo Jardín Botánico Nacl. (CSU)	28 June 2009	1	Frank Bingham
Punta Cana Club Med (CRT)	26 April 2008	X	Tamie Bulow
Punta Cana (CRT) (Grounds of the Grand Palladium)	16 November 2007	1	Caribbean WorldBirds
Bávaro Resort)			
Punta Cana (CRT) (grounds of the Grand Palladium)	16 November 2007	X	Ted Goshulak
Bávaro Resort)			
Bávaro Beach (CRT)	30 May 2003	X	Andy Dettling
Punta Cana Iberostar Hotel (CRT)	28 May 2003	X	Andy and Mark Dettling
Punta Cana (CRT)	20 February 2003	4 (“2 inds. obs.”) (to assume that 2 additional thrashers were heard)	Olivier Langrand
Punta Cana Ecological Reserve (CSU) (forest)	23, 25 January 1995	X	Peter Adhemar
Guaraguao Parque Nacional Del Este (CRL)	25, 26 February		
	3 February 1984	1 (mist-netted in dry forest)	Chandler S. Robbins and Tomás A. Vargas Mora

^AThrashers in the photos and the mist-netted bird at the Plaza de Cultura were aged and sexed by a coauthor (WJA); ages were determined using molt and age classification codes derived by Wolfe et al. 2010:
FCF (first molt cycle, formative plumage)

SCB (second molt cycle, basic plumage)

UCB (unknown molt cycle, basic plumage)

Gender (male, female) was determined by appendicular proportions, plumage differences and soft parts.

^BKevin Hannah photo – this immature (FCF) individual retains remnants of a dark eye and fleshy commissure (gape), and it is in formative plumage—note the replaced second alula; the bird most likely hatched in early 2013; it shows “mixed” gender characteristics, although it is possibly an immature male, owing to 3 “male” characters: (1) prominent white malar streak; (2) rudimentary white margins of tertials, greater coverts and tail; (3) solid brown “chevron” pattern in the center of the ventral tract feathers, which contrast highly with their white centers and white feather margins. However, there are two apparent “female” characters, i. e., prominent, bulbous bill, and short tail in proportion to entire body length.