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Hurricane-Related Vagrancy of Swainson's Thrush and Veery in Puerto Rico

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ABSTRACT.—Low pressure waves that contributed to the formation of Hurricane Wilma in the western Caribbean produced westerly winds in the central Caribbean and Puerto Rico during the second week of October, 2005. On October 12 and for the following two weeks Swainson's Thrush (*Catharus ustulatus*, six locations) and Veery (*C. fuscescens*, one location) were reported from the island. These species usually migrate through Central America and the central Caribbean and appear not to have been recorded before in Puerto Rico. The hurricane season overlaps the autumnal migration. Increase in cyclonic activity with local wind direction dependent on the location of centers of low pressure may increase vagrancy.

KEYWORDS.—Neotropical migrant, cyclone, *Catharus*, Greater Antilles, Wilma

The association between hurricane season in the Caribbean and the fall migration of birds exposes trans-Gulf and Caribbean migrants to cyclonic winds that may blow strongly from any direction. Daily mean track and wind direction for over-water migrants are often correlated (Richardson 1990, but see Gauthreaux et al, 2006). Consequently, the recent increases in number (Webster et al. 2005) and intensity of hurricanes (Hoyos et al. 2006) may result in increased vagrancy.

Neotropical migrants reach Puerto Rico in the eastern Greater Antilles from late August to November. Some species remain for the winter; others continue to South America. Puerto Rico has fewer regular transient species than the western Greater Antilles (Arendt et al. 1992), but many species have been reported from Puerto Rico as casual transients (Arendt et al. 1992; Raffaele et al. 1998; Oberle 2003), where *casual* means a single or several historical records for a given species. This note describes an extraordinary incursion of *Catharus* thrushes, including both Swainson's Thrush (*Catharus ustulatus*) and Veery (*Catharus fuscescens*), into Puerto Rico on 12 October, 2005, in association with the development of Hurricane Wilma.

Among *Catharus* thrushes only Bicknell's Thrush (*C. bicknelli*, referred to as Gray-cheeked Thrush, *C. minimus* in older reports) over-winters in Puerto Rico and is likely present in at least low numbers every season (Rimmer et al. 2001). Gray-cheeked Thrush may occur as an infrequent transient in Puerto Rico, but its status throughout the eastern Caribbean is uncertain because of confusion with Bicknell's Thrush (Lowther et al. 2001). Puerto Rico is east of the autumnal migratory route followed by Swainson's Thrush and Veery (Evans Mack and Yong, 2000; Ruegg and Smith, 2002; Bevier et al. 2004). To my knowledge these species have never been recorded on the island.

The summary by Arendt et al. (1992) of the work of many observers reports Swainson's Thrush from the Bahamas (uncommon transient), Cuba (common transient), Jamaica (casual transient), and the Dominican Republic (casual transient). Keith et al. (2003) consider no reports for Swainson's Thrush for Hispaniola to be substantiated. McNair et al. (1999) netted a single individual in Barbados during the autumn migration. Swainson's Thrush is reported to winter from southern Mexico to northern South America (Evans Mack and Yong 2000). Ruegg and Smith (2002) used banding reports and mtDNA haplotypes to show that birds nesting in the forests of the Pacific coast west of the coastal ranges winter in Mexico and Central America while birds nesting in continental western North America and eastern North America migrate south along an eastern route and overwinter in Panama and western South America. The cone in Fig. 1A summarizes the distribution of lines that connect recoveries of banded Swainson's Thrush in eastern North America and South America as reported by Ruegg and Smith (2002). The cone is consistent with the occurrence of the species as a transient in Cuba, Jamaica, and the Bahamas.

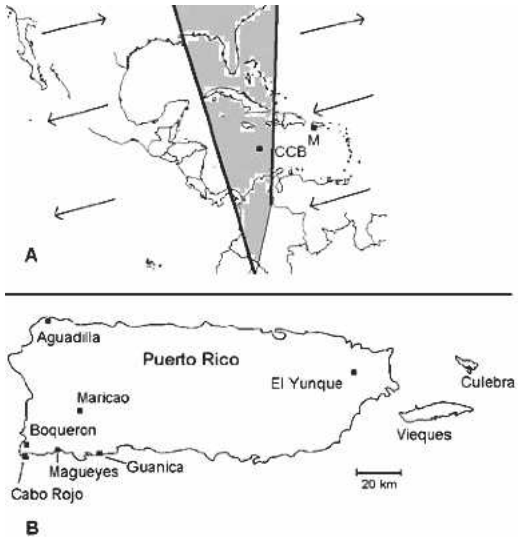

FIG. 1A,B. Maps of the Caribbean Basin and Puerto Rico. A) The gray cone shows the distribution of lines that connect recoveries of banded Swainson's Thrush in eastern North America and South America as reported by Ruegg and Smith (2002). The arrows show prevailing winds; storm winds are not shown. Point CCB is the Central Caribbean Buoy. Point M is Magueyes Island, Puerto Rico. B). Map showing locations for Swainson's Thrush and Veery in Puerto Rico in October, 2005. Magueyes is the site of the Magueyes Weather Station.

Arendt et al. (1992) report Veery from Bahamas (casual transient), Cuba (uncommon transient), Cayman Islands (casual transient), Jamaica (casual transient), Dominican Republic (casual transient and winter resident), and Saint John (casual transient). In light of Remsen's (2001) claim that all Veery winter in southeast Brazil, it would seem likely that Veery do not actually winter in the Dominican Republic and occur only sporadically in the eastern Caribbean (Bevier et al. 2004). However, a specimen of Veery was collected in January 1980 near Bonao, Dominican Republic (Keith et al. 2003). Neither species is reported from Puerto Rico by Arendt et al. (1992) nor in more recent summaries (Oberle 2002; Raffaele et al. 1998).

On October 12, 2005, a large fallout of Neotropical migrants that included many Swainson's Thrush, at least two Veery, and other unusual species (Eastern Wood-Pewee (*Contopus virens*), *Empidonax* sp., and Philadelphia Vireo (*Vireo philadelphicus*)) occurred over western Puerto Rico. Dates, observers, and numbers of the two thrushes are given in Table 1. The locations are marked in Fig. 1B. Five of the observers were professional biologists who work with birds; the others were all experienced birders. Initial sightings at a location were incidental observations; subsequent visits were made to see if the birds were still present. Empty cells mean I do not have information. I visited the Aguadilla location daily during early October. The birds were not present before the morning of the twelfth. Swainson's Thrush were seen in a variety of habitats from October 12 to 26; Veery were seen from October 12 to 20. Photographs of both species are filed with the bird collection at the University of Puerto Rico, Mayaguez.

The Cabo Rojo (elevation ~1m), Boqueron (~1m), and Guanica (100m) sites were all in the subtropical dry forest life zone of Ewel

TABLE 1. Dates and numbers of Swainson's Thrush and Veery seen at sites in Puerto Rico during October, 2005. Observers are named in footnote.

	Dates in October														
Sites	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	Numbers of individuals seen														
Swainson's Thrush															
Aguadilla[1]	8	6	6	6	6	6	1	1			1				1
Cabo Rojo Salinas	12[2]		16[3]		10[4]				1[1]						
Boqueron Refuge					1[5]	1[5]			1[1]						
Maricao forest[6]							12								
El Yunque			1[7]				1[7]	1[8]	1[8]	1[8]			4[9]		
Guanica[10]										7					
Veery															
Cabo Rojo Salinas[2]	2[2]				2[4]				1[1]						

1) Allen Lewis; 2) Sergio Colon, Manuel Cruz; 3) Rafael Rodriguez; 4) Sergio Colon, Jose Colon, Ana Pazos, Jose Rodriguez; 5) Michael Morel; 6) Carlos Delannoy; 7) Jean Lodge; 8) Matthew Anderson, Javier Mercado; 9) Matthew Anderson; 10) Javier Mercado.

and Whitmore (1973). The Aguadilla (20-50m) and Maricao (680 m) sites were in the subtropical moist forest life zone. In Aguadilla the birds fed on the ground and ate fruits from the tree *Citharexylum fruticosum*. In Maricao the birds ate fruit from the tree *Trema micrantha*. The El Yunque site (100-140m) was in the subtropical wet forest of the Caribbean National Forest in eastern Puerto Rico.

The simultaneous appearance of Swainson's Thrush at other locations in the eastern Caribbean shows the regional scale of the event. Landestoy et al (in press) recorded on Hispaniola two individuals at Salinas de Bani on 16 Oct 2005 and on Oct 24 another bird was seen at Rabo de Gato. Anthony Levesque (personal communication) saw and photographed a single bird on the island of La Desirade, Guadeloupe on October 21-23, 2005. In both cases these appear to be first records for Swainson's Thrush.

In autumn, 2005, three category 5 hurricanes inflicted heavy damage on Central America, Cuba, and the US coastline. The strongest of these storms was Hurricane Wilma, the most powerful storm ever recorded in the Atlantic basin (National Hurricane Center 2005). A tropical wave of low pressure that eventually contributed to the formation of Hurricane Wilma in the western Caribbean produced westerly winds in the central and eastern Caribbean and was the likely proximal cause for the arrival in Puerto Rico of the thrushes.

Directions of surface winds at the Central Caribbean Buoy (National Data Buoy Center 2005a) and the Magueyes Weather Station (National Data Buoy Center 2005b) for the month of October, 2005, are given in Fig. 2A,B. The Central Caribbean Buoy (15°N 75°W) is south of the eastern end of Cuba (Fig. 1A). The Magueyes Station in Puerto Rico (18°15′N 67°3′W) is shown in Figs. 1A,B. Winds at the Central Caribbean Buoy started the month blowing from the east but swung toward the west on October 9 and continued from the southwest through October 14. During the days of Oct 10-11 the average wind speed was 33.8 km/h. A second brief period of southwest winds occurred on October 22-23 as Hurricane Wilma approached Florida. Through most of the month of October Magueyes on the south coast of Puerto Rico experienced the usual easterly trade wind overlain by the daily shift between onshore and offshore breeze that is a consequence of local convection. Winds came out of the northeast in the middle of the night and rotated around to the south by the middle of the day. However, on October 10 and 11 the winds averaged out of the southwest with average speed of 17.6 km/h while still exhibiting the convection cycle.

Every fall the continental populations of Swainson's Thrush depart from southeast-

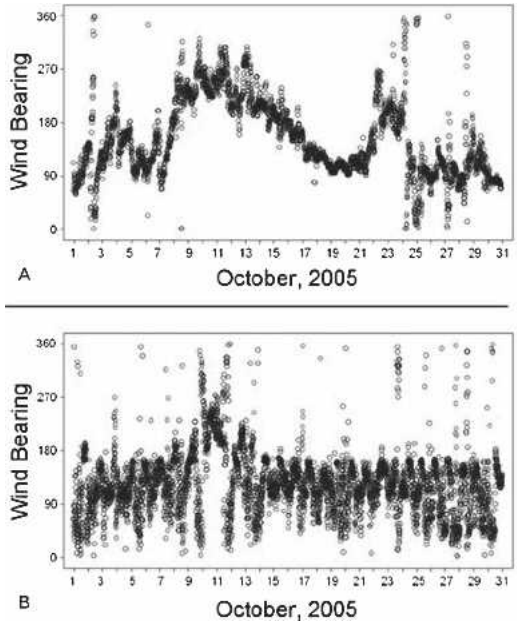

FIG. 2A,B. Wind bearing versus date for October, 2005. A) Data from the Central Caribbean Buoy (Buoy 42058) (National Buoy Data Center 2005a). Points are 10 minute average wind direction in degrees clockwise from true north. B) Data from Magueyes Island, Puerto Rico (Weather Station MGIP4–9759110) (National Data Buoy Center, 2005b). Points are 6 minute average wind direction in degrees clockwise from true north. Swainson's Thrush was first detected in Puerto Rico on the morning of October 12, 2005.

ern North America on route to wintering grounds in South America (Ruegg and Smith, 2002). Studies of migrating Swainson's Thrush show path azimuth and ground speed to be affected by winds. Cochran et al. (1967) followed northbound Swainson's Thrush in Illinois by telemetry. They found air speed often to be less than ground speed and suggested use of following wind by the birds. Cochran (1986), while tracking a single north bound migrant over 1500 km from Illinois to Manitoba, showed the thrush able to maintain a constant heading even though the path azimuth shifted through a 90° range as a consequence of inconstant wind direction. He calculated average air speed of the thrush to be 39.3 km/h. Crawford (1980), from analysis of patterns of kills at radio towers, argued that Swainson's Thrush departing northwest Florida on trans-gulf flights waited for following, easterly winds. Once the birds reached the northeast trade winds at about 25°N, flight downwind, barring storms, would carry them toward Central America.

The Swainson's Thrush, Veery, and other Neotropical migrants first observed on 12 October, 2005, reached Puerto Rico during an unusual period of southwest winds that were in effect at the Central Caribbean Buoy for the three days preceding first detection of the thrushes in Puerto Rico. The birds arrived en masse in Puerto Rico during the night of 11-12 October after flying downwind or drifting toward the east despite a more southerly heading. Aguadilla and Cabo Rojo, 60 km apart, appear to have received birds at the same time. Since the thrushes were still being seen in Aguadilla and Cabo Rojo when they were first detected at other locations, it is possible that all the sites in Western Puerto Rico received birds at the same time. Birds were not detected at other sites for several days, but to my knowledge no one was searching systematically for vagrants. Alternatively, the birds may have landed first on the west coast and then moved inland during the subsequent week before disappearing. I have no reports for Swainson's Thrush after October 26.

Normal autumnal migration routes through Cuba to Central and South America may follow prevailing trade winds once the birds enter the tropics. When cyclonic disturbances disrupt normal wind patterns, migratory tracks followed by the birds can change direction entirely as exemplified by the regional displacement of *Catharus* thrushes described here. If hurricane activity continues to increase, the frequency of disruptions during the peak of migration will also increase and may lead to greater vagrancy.

Such vagrancy seems likely to be a source of significant mortality for overwater migrants. If southbound birds are blown toward the east in the Caribbean and do not strike an island, they will eventually fall into the sea. If the wind returns to normal patterns and the birds backtrack toward South America, they may not have the fat reserves necessary to complete the

longer flight. Thus increased hurricane activity may lead not only to greater vagrancy but also to greater mortality.

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