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NOTES

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ABUNDANCE OF NEOTROPICAL MIGRANT SONGBIRDS ON NORTH ANDROS ISLAND, BAHAMAS

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Arendt (1992), in a summary of the status of neotropical migrants in the Caribbean, concluded that species abundance, distribution, and habitat use are not well known in much of the Caribbean region. The Bahamas are no exception. Habitat-specific data on the distribution of migrant species on these islands are limited (Emlen 1977). This study is intended to provide information on the occurrence and relative abundance of migrant passerine species in three habitat types on North Andros Island, Bahamas.

My observations were made from 16 December 1991 to 3 January 1992 in the vicinity of Staniard Creek, N. Andros Island (24°53'N, 77°55'W). Single, 1-km line transect counts without distance estimates were conducted in each of three habitat types: dry forest (DF), urban (U), and pine (P). This habitat nomenclature follows descriptions in Arendt (1992). Transects were surveyed for a total of 14 rainless mornings between 0700 and 1100 (U = 5 visits; DF = 4 visits; P = 5 visits). I walked the transects alone covering the routes at about 0.5 km/hr. "Fishing" was employed to increase detectability.

Eighteen species of migrant landbirds were recorded in the three habitats surveyed and included the Gray Catbird, 13 species of paruline warblers, two species of vireos, and two species of buntings (Table 1). Yellow (*Dendroica petechia*) and Pine Warblers (*D. pinus*) were also detected but were assumed to be permanent residents (Brudenell-Bruce 1988). Migrants accounted for 59% of the passerine species detected.

Prairie, Palm, and Cape May Warblers were the most abundant species recorded, accounting for 51% of all migrant individuals (Prairie = 22%, Palm = 16%, Cape May = 13%) (Table 1). Seven other species, White-eyed and Yellow-throated Vireos, Tennessee, Black-throated Green, and Black-and-white Warblers, Ovenbird, and Painted Bunting, accounted for only 4% of all migrant individuals detected.

The urban habitat had the highest species richness (17 species) while the pine habitat had the lowest (7 species). Ten species were detected in the dry forest habitat. Cape May Warblers and Common Yellowthroats were consistently recorded in only the urban habitat while five species were observed infrequently only in this habitat. The Black-throated Green Warbler, an uncommon winter visitor to the Bahamas (Brudenell-Bruce 1988), was detected only in dry forest. Several species were observed frequently in two habitats; Palm Warbler (U and P), Gray Catbird (U and DF), Yellow-throated Warbler (U and P), Northern Parula (U and DF), Black-throated Blue Warbler (U and P), American Redstart (U and DF), and Worm-eating Warbler (U and DF). The Prairie Warbler was consistently recorded in all habitats. Of the 12 species recorded in more than one habitat, seven were most abundant in the urban habitat, while three were most abundant in the dry forest, and two, Palm and Yellow-throated Warblers, were most abundant in pine forest. Only the Cape May Warbler and the Common Yellowthroat were significantly more abundant in a single habitat (urban: Cape May Warbler, $\chi^2 = 7.36$, $P < 0.01$; Common Yellowthroat, $\chi^2 = 4.44$, $P < 0.05$).

Species richness was greatest in the urban habitat, which is consistent with previous observations in the Bahamas (Askins et al. 1992). Urban areas, characterized by small

remnants of dry forest, abandoned and active garden plots and many ornamental and fruit trees with their attendant insects, appeared to attract migrants. Fifty-eight percent of migrant species detected in more than one habitat were most abundant in urban settings. In addition, Cape May Warblers and Common Yellowthroats were significantly more abundant in urban habitat than in dry or pine forest. Bond (1957) noted the apparent preference of Cape May Warblers for gardens, while Common Yellowthroats are known to prefer disturbed areas and open fields (Greenberg 1992).

The dry forest had intermediate species richness, with three species most abundant in this habitat and one, the Black-throated Green Warbler, restricted to it. Similar to the findings of Faaborg and Arendt (1984), species richness was difficult to quantify in this habitat because the thick forest vegetation increased the difficulty of making visual detections. It is probable that some species were present but not detected (e.g. Ovenbird), and that many species detected in this habitat were more abundant than recorded (pers. obs.). Therefore, the species richness of this habitat may approach that observed in the urban habitat with several additional species potentially reaching their maximum abundance in dry forest. In support of this conjecture, Emlen (1977) found that dry forest on Grand Bahama had the highest migrant species richness and second highest migrant density of all habitat types surveyed, which did not include an urban habitat as described above.

Table 1. Occurrence and relative abundance of migrant passerine species observed from 16 December 1991 to January 1992, North Andros Island, Bahamas.

Species	Relative abundance ¹		
	Urban	Dry Forest	Pine
Gray Catbird, <i>Dumetella carolinensis</i>	3.8 (100)	4.0 (100)	--
White-eyed Vireo, <i>Vireo griseus</i>	0.2 (20)	--	--
Yellow-throated Vireo, <i>V. flavifrons</i>	0.2 (20)	--	--
Tennessee Warbler, <i>Vermivora peregrina</i>	0.4 (40)	--	--
Northern Parula, <i>Parula americana</i>	2.2 (80)	2.3 (75)	--
Black-and-white Warbler, <i>Mniotilta varia</i>	0.2 (20)	1.0 (50)	--
Black-throated Blue Warbler, <i>Dendroica caerulescens</i>	1.8 (80)	0.5 (25)	1.2 (100)
Cape May Warbler, <i>D. tigrina</i>	9.0 (100)	--	0.6 (40)
Black-throated Green Warbler, <i>D. virens</i>	--	1.0 (50)	--
Yellow-throated Warbler, <i>D. dominica</i>	2.4 (80)	--	4.2 (100)
Prairie Warbler, <i>D. discolor</i>	8.0 (100)	3.5 (75)	4.8 (100)
Palm Warbler, <i>D. palmarum</i>	5.4 (100)	--	6.2 (80)
Worm-eating Warbler, <i>Helmitheros vermivorus</i>	0.6 (60)	0.5 (50)	--
Ovenbird, <i>Seiurus aurocapillus</i>	0.2 (20)	--	--
Common Yellowthroat, <i>Geothlypis trichas</i>	3.6 (100)	0.3 (25)	0.6 (20)
American Redstart, <i>Setophaga ruticilla</i>	1.4 (60)	1.0 (50)	0.2 (20)
Indigo Bunting, <i>Passerina cyanea</i>	1.0 (40)	0.3 (25)	--
Painted Bunting, <i>P. ciris</i>	0.4 (40)	--	--

¹Relative abundance = total individuals recorded / number of site visits. Frequency of detection, shown in parentheses, is percentage of site visits on which species was detected.

Pine forest had the lowest species richness of the three habitats surveyed. However, several of the island's most common migrant species (including Prairie, Palm and Cape May Warblers) were observed in this habitat and Palm and Yellow-throated Warblers were most abundant here. Whereas species richness was relatively low in this habitat, it is the most extensive of the habitats surveyed. Pine forest covers about 1550 km² on North Andros, while the urban and dry forest habitats combined cover only about 150 km² (McRitchie 1988). Although pine forest is not a preferred habitat for most migrant species, it may support a large number of migrant species and individuals by virtue of its extent.

Recently, the Bahamian government has considered initiating sustained-yield logging of the pine forests in the Northern Bahamas, including North Andros (Smith and Vankat 1992). These operations, in addition to on-going agricultural development projects, could greatly reduce the amount of mature and submature pine forest on the island. Dry forest could also suffer losses during logging and agricultural operations since it would not likely be spared during land clearing (pers. obs.). As pine and dry forest are lost, the extent of urban habitat on the island will increase. My findings suggest that these habitat losses would reduce the amount of preferred winter habitat for some migrant songbird species, including the Black-and-white and Yellow-throated Warblers, while gains in urban habitat would increase the amount of preferred winter habitat for many others, including Cape May and Prairie Warblers and Common Yellowthroats.

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