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ABSTRACT

Capture times of 6500 migrant passerines caught in mist nets at the Kaiser-Manitou Beach Banding Station at Braddock Bay, New York, on the south shore of Lake Ontario, during May 1993 to 1996, were analyzed. Results were compared with data from a similar study conducted by Prince Edward Point Bird Observatory at Point Traverse, Ontario, Canada, on the north shore of Lake Ontario. There were significant interspecies differences in capture times which have implications for researchers developing census protocols for migrants along the Lake Ontario shoreline. The mean capture time for 15 of 17 species caught at both sites was from 0.3 to 2.2 hours earlier at Braddock Bay. This phenomenon may be due to the effect of Lake Ontario, topographical or habitat differences, prevailing wind direction, or a combination of influences.

INTRODUCTION

Although a number of researchers have studied migration relative to the Atlantic and Gulf coasts, there has been relatively little study of the effect of large, inland bodies of water such as the Great Lakes, on passerine migration.

Deslauriers and Francis (1991) summarized previous research on time-of-day effects on auditory and visual bird censuses. Before their study, little research had been done on mist net capture times. More recent papers by Jenni et al. (1996) and Pardiek and Waide (1992) studied efficiency of mist nets which could impact on capture times. Remsen and Good (1996) cautioned against misuse of mist net data to assess avian population status, especially when the sampling setup did not include aerial nets (neither Braddock Bay nor Traverse used aerial nets). Deslauriers and Francis (1991) analyzed mist net capture times of spring migrants at Prince Edward Point on the Canadian shore of Lake Ontario near Kingston during 1976 to 1980 and in 1988 and found behaviorally induced differences in mean capture times of many species.

In this paper, capture times of spring migrants at the Kaiser-Manitou Beach (K-MB) Banding Station at Braddock Bay during 1993 to 1996 are analyzed and compared with the results of the study conducted by Prince Edward Point Bird Observatory at Point Traverse.

METHODS

The K-MB Station is located within 150 m of the shoreline of Lake Ontario, 24 km NW of Rochester, New York (coordinates 431-0774). Habitat includes shrubby fields, wet deciduous woods, and hedgerows. A "constant-effort" mist-netting operation, with 20 to 25, 12-m nylon top-tethered 1¼" mesh nets, was run daily (weather permitting) during May from 1993 to 1996. A strict protocol was established so that nets, raised in a consistent manner, were set daily by sunrise and kept open for at least eight hours. Birds were removed from nets every half hour beginning at exactly 15 minutes after sunrise. They were brought back to a work area where they were banded, processed, and released. On busy days, birds were held in cages that were marked carefully as to the birds' time of capture. Although the time of processing was also recorded, it is only the capture time that was used in this study. Capture time was not kept for birds handled later than the eighth hour after sunrise.

As in the Prince Edward Point study, capture time was transformed into the nearest hour after sunrise to account for changing sunrise times throughout the month. Capture time data were used only from days where the full eight-hour protocol was employed.

RESULTS

Capture times, based on the hour after sunrise, of 6500 birds banded during May 1993-1996 were recorded and the distribution represented in Fig. 1. There is a decreasing order in numbers of captures from a high of 1492 during the first hour after sunrise to a low of 313 during the eighth hour after sunrise, with a mean capture time of 3.0 hours after sunrise.

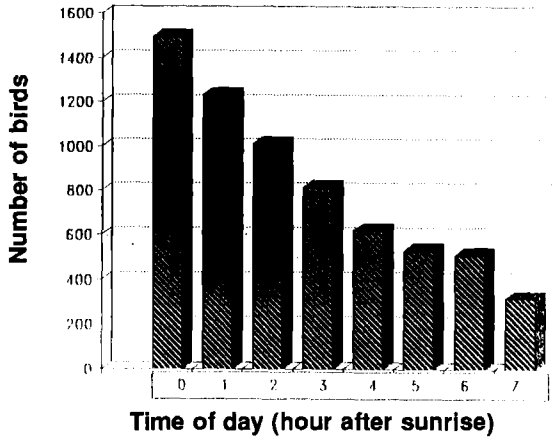

Fig. 1. Capture times of all species (n = 6500) captured during the first eight hours after sunrise at Braddock Bay during spring 1993-1996.

Table 1 presents data on capture times of 4642 birds of 17 species at the K-MB station. Gray Catbird, Lincoln's Sparrow and White-throated Sparrow were caught earlier in the day (mean capture time after sunrise 1.9 - 2.2 hrs.), while mean capture times for Yellow Warbler, Magnolia Warbler, Yellow-rumped Warbler, American Goldfinch, and Blue Jay occurred later in the day (mean capture time after sunrise 3.0 - 4.4 hrs.). Fig. 2 shows the varied patterns of capture times for six representative species at Braddock Bay during spring 1993-1996, which reflects individual species' daily foraging and activity schedules as well as differing arrival times at the capture site.

Blue Jay daily capture times vary significantly in migration and non-migration years. Fig. 3 shows the capture pattern for Blue Jays in 1993 (a non-migration year) and in 1994 (a year of heavy migration). In 1993, captures were mainly of local jays who foraged throughout the day while the jays captured in 1994 were migrants, dropping down to forage and rest in the area during mid-day hours.

Table 1. Capture times of 17 species at Braddock Bay during spring 1993-1996.

	Numbers Captured Per Hour After Sunrise									
Species	**Total**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**MCT***
Traill's Flycatcher	181	46	34	34	19	16	15	8	9	2.8
Least Flycatcher	205	51	32	40	22	31	9	11	6	2.7
Blue Jay (1993-1996)	268	23	21	28	34	48	31	50	33	4.4
Blue Jay (1993)	25	4	5	3	4	4	1	1	3	3.4
Blue Jay (1994)	132	13	11	9	8	23	21	34	13	4.6
Ruby-crowned Kinglet	523	89	94	100	59	49	64	52	16	3.2
Swainson's Thrush	127	43	18	18	20	13	7	6	2	2.5
American Robin	26	4	8	2	6	2	2	2	0	3.1
Gray Catbird	424	168	95	47	36	24	18	26	10	2.2
Red-eyed Vireo	41	8	9	7	11	3	0	3	0	2.6
Yellow Warbler	515	116	68	80	72	60	49	49	21	3.2
Chestnut-sided Warbler	128	33	22	27	10	9	11	11	5	2.8
Magnolia Warbler	680	121	145	122	102	51	77	34	28	3.0
Yellow-rumped Warbler	369	93	53	38	63	34	38	33	17	3.1
American Redstart	410	93	81	67	52	35	27	35	20	2.9
Common Yellowthroat	342	116	56	44	36	34	15	22	19	2.6
Lincoln's Sparrow	61	21	15	8	8	5	2	2	0	2.1
White-throated Sparrow`	266	99	77	39	16	14	16	5	1	1.9
American Goldfinch	176	12	51	23	29	18	18	20	5	3.3

*MCT - mean capture time, hours after sunrise

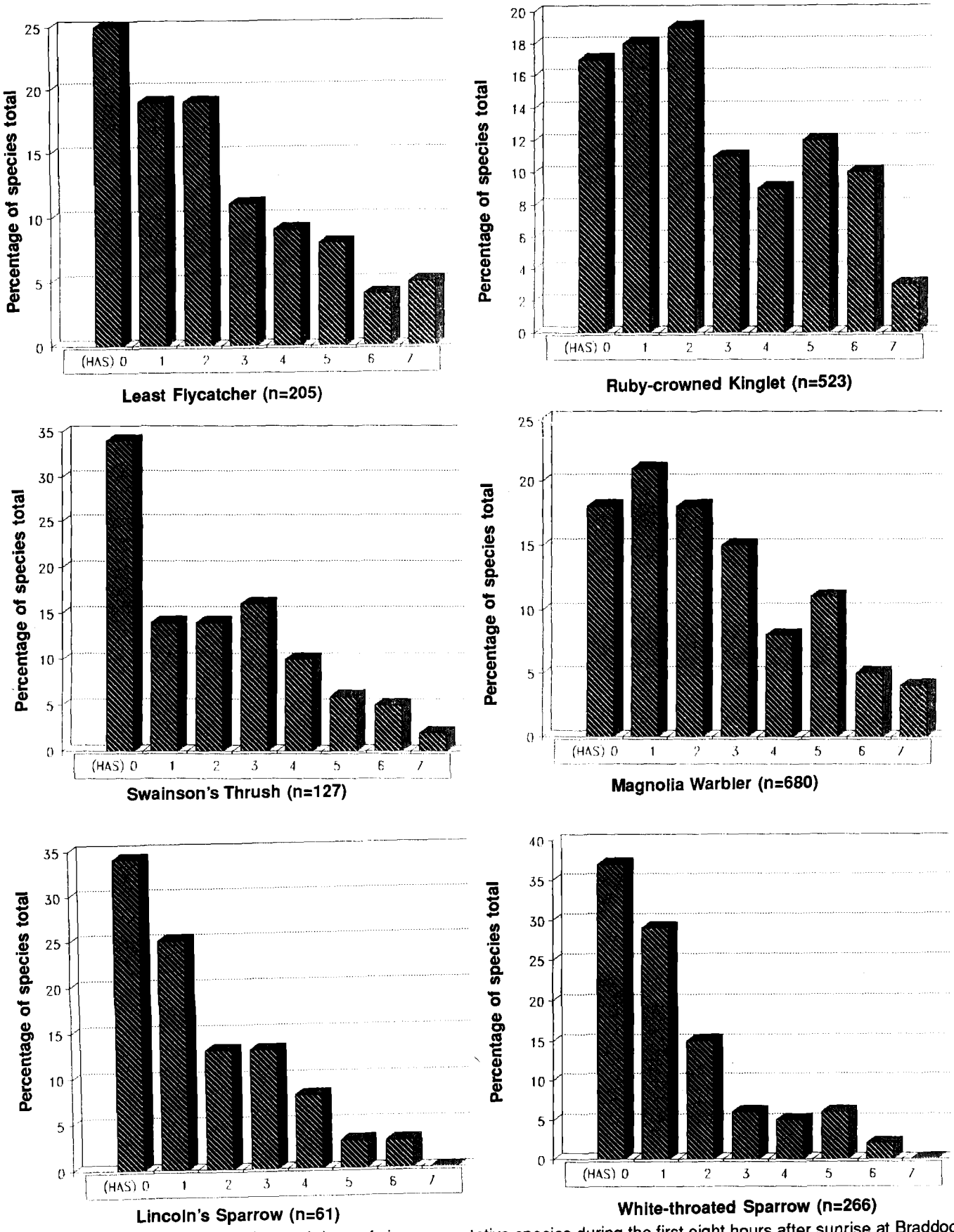

Fig. 2. Percent of captures during each hour of six representative species during the first eight hours after sunrise at Braddock Bay during spring 1993-1996.

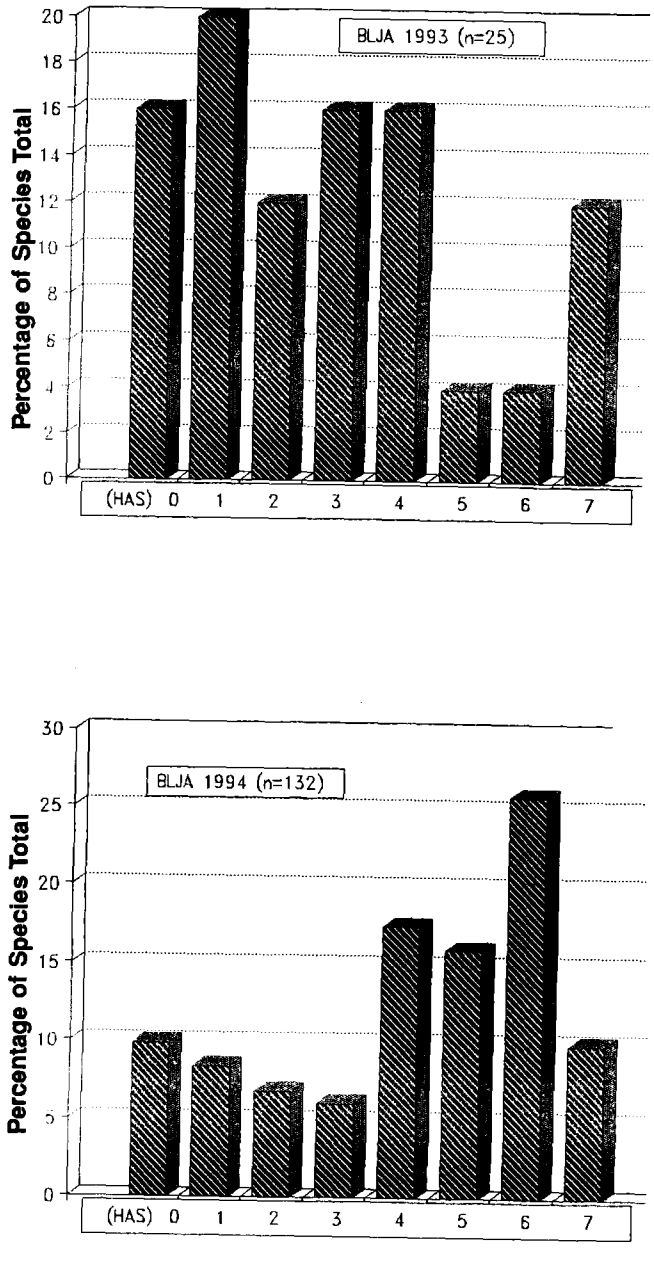

Fig. 3. Percent of captures each hour of Blue Jays (n=25) in the first eight hours after sunrise at Braddock Bay during spring 1993 (a non-migration year) and Blue Jays (n=132) during spring 1994 (a migration year).

Results of this study at Braddock Bay, located on the south shore of Lake Ontario, were compared with results of the study done at Prince Edward Point (Point Traverse), Ontario, Canada, located 101 km NE of Braddock Bay on the north shore of Lake Ontario. Table 2 shows the mean capture times, and the difference in these times of 17 species studied at both stations. These species all were captured in numbers greater than 20 individuals with a similar protocol used at both stations. Mean capture times were from 0.3 to 2.2 hours earlier at Braddock Bay than at Point Traverse for all but three species. Only Swainson's

Table 2. Comparison of mean capture times after sunrise for 17 species banded at Braddock Bay (BB) and Point Traverse (PT).

	Mean Capture Time		Diff. in Hrs.
Species	BB	PT	
Traill's Flycatcher	2.8	3.8	-1.0
Least Flycatcher	2.7	3.2	-0.5
Blue Jay	4.4	5.5	-1.1
Ruby-crowned Kinglet	3.2	3.6	-0.4
Swainson's Thrush	2.5	2.2	+0.3
American Robin	3.1	2.0	+1.1
Gray Catbird	2.2	2.5	-0.3
Red-eyed Vireo	2.6	3.7	-1.1
Yellow Warbler	3.2	3.7	-0.5
Chestnut-sided Warbler	2.8	4.1	-1.3
Magnolia Warbler	3.0	3.8	-0.8
Yellow-rumped Warbler	3.1	4.0	-0.9
American Redstart	2.9	3.5	-0.6
Common Yellowthroat	2.6	3.8	-1.2
Lincoln's Sparrow	2.1	2.4	-0.3
White-throated Sparrow	1.9	1.8	+0.1
American Goldfinch	3.3	4.3	-1.0

Thrush, American Robin, and White-throated Sparrow had mean capture times later in the day at Braddock Bay than at Point Traverse.

DISCUSSION

Daily activity patterns and arrival times at the banding stations at Braddock Bay and Point Traverse greatly influence mean capture time. For diurnal migrants like Blue Jay and American Goldfinch, capture times occur later in the day than for nocturnal migrants. Deslauriers and Francis (1991) summarized the foraging and activity patterns of various species which influence capture time. Ground-foraging insectivore species tend to be caught earlier in the day, while aerial and forage-gleaning insectivores are usually caught later.

These data indicate that in 15 of 17 species for which statistical comparisons could be made, there was a significantly earlier capture time on the south shore of the lake. An explanation for the later capture times on the north shore may involve a number of migrational lake-effect factors. It seems logical that there may often be a portion of any given night's flight of migrants that could be caught over the waters of Lake Ontario as dawn approached, and those birds would take longer to reach landfall.

Food resources and habitat at the two stations may influence capture times. Ewert and Hamas (1995) showed wide variation in different species' foraging strategies and habitat and resource requirements in various lakeshore stopover habitats. Habitat at Point Traverse includes mostly dry mixed woodland and scrub, with smaller sections of swampy, mixed coniferous and deciduous woodland. Habitat at Braddock Bay is mainly shrubby, low successional growth, hedgerow, and wet deciduous woods.

Additionally, differences in shoreline topography and prevailing wind direction at the two stations could influence capture times. Further study is needed to provide an adequate explanation of the earlier capture times on the south shore of Lake Ontario.

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