FALL MIGRANT LANDBIRD STOPOVER IN SUBALPINE SPRUCE-FIR FOREST, MOUNT MANSFIELD, VERMONT

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Abstract: The stopover ecology of fall migrant landbirds on Mt. Mansfield, Vermont was examined through standardized mist-netting and banding in 1995. We captured 948 individuals of 51 species during 11 weeks of banding. Peak waves of migrants occurred from late September through mid-October. 1). Over 77% of captures were of HY (hatching year) birds. Blackpoll Warbler (*Dendroica striata*) was the only species not exhibiting a strong HY bias. Unexpectedly high numbers of immature Black-throated Blue Warblers *(Dendroica cearulescens)*, a species that breeds in northern hardwoods forests, were captured during August and September. Regular searches of areas below tranmission towers on Mt. Mansfield and Mt. Ascutney yielded only three dead birds, a Myrtle Warbler (*Dendroica coronata*) and a Hairy Woodpecker *(Picoides villosus)* on Mt. Mansfield, and a Blackpoll Warbler on Mt. Ascutney.

Introduction

Most passerines breeding in eastern Canada and the northeastern U.S. migrate to lower latitudes during late summer and fall. The ability of migrants to offset the energetic costs of migration may depend on the availability and quality of suitable stopover habitat to satisfy intensive energy demands, successfully avoid predators, and survive inclement weather conditions (Moore and Simons 1992). Few studies have examined the use and importance of subalpine forests in the northeastern U. S. for post-breeding dispersal and migratory stopover by landbirds. During the fall of 1995 we examined the diversity and relative abundance of migrant landbirds using the subalpine spruce-fir forest of Mt. Mansfield, Vermont.

Methods

The study area (ca. 10 ha) was located on the summit ridgeline of Mt. Mansfield, Vermont in subalpine spruce-fir at 1,095 to 1,160m elevation. A narrow dirt access road, small dirt parking lot and several hiking trails transversed the area. Several small, open grassy areas were located around the parking lot. During the fall of 1995 (2 Aug through 13 Oct) we operated 10-15 nylon mist nets (ATX, 12 x 2.6m, 4 panels, 36 mm extended mesh) at fixed locations. Nets were opened five days a week for six hours, beginning 0.5 hr before sunrise. Nets were closed under adverse weather conditions. Frequent high winds on the ridgeline forced the regular closure of some nets in exposed sites and on the western slope of the study area. Each captured bird was banded with a USFWS metal band. Detailed mensural (e.g., wing chord, weight) and body condition (e.g., subcutaneous fat, molt, feather wear) data, as well as sex and age, were recorded for all captured birds. Records of net opening and closing times, weather, and general levels of avian activity were kept.

We monitored two transmission tower sites on the ridge for possible migrant collisions. One tower was situated on a high point of the ridgeline and rose approximately 25m high. The second tower was located near the base of a north-facing cliff on the ridgeline and was about 45m high. Neither tower was lighted. At dawn on each morning of mist net operation, observers systematically searched areas under the towers for dead or injured birds. Searches were conducted at dawn to avoid the possible loss of downed birds from predators or scavengers. For comparative purposes, we also searched two transmission towers on Mt. Ascutney in central Vermont on 8 mornings in September and early October. One tower was located on the summit and rose approximately 20m high and another tower was at a slightly lower elevation on the southeast side of the mountain. It had several red flashing lights and was approximately 50m tall.

Results and Discussion

We captured 948 individuals of 51 species during 11 weeks of banding (Table 1). Peak waves of migrants occurred at the end of September and through mid-October (Fig. 1). Over 77% of captures were of HY (hatching year) birds. The only species not exhibiting a strong HY bias was the Blackpoll Warbler. During August 88% of Blackpoll Warblers captured were HY individuals, but during this species' main migration period in September 59% of captures were of AHY birds. This suggests that most Blackpoll Warblers captured during August were locally-fledged or undergoing post-fledging dispersal. Alternatively, HY Blackpoll Warblers may initiate southward migration earlier than adults or may follow different migratory routes. Another noteworthy result was the relatively high proportion of Black-throated Blue Warblers in our overall sample (Table 1). This species, which nests in northern hardwoods forests, appeared to undergo a pronounced post-breeding dispersal into Mt. Mansfield's subalpine zone. HY birds outnumbered AHY individuals 68 to 3.

Based on a single morning's mist-netting on Mt. Mansfield during the fall of 1994 we expected to encounter greater numbers of passage migrants in 1995. On 14 September 1994, following a night of low clouds, rain and warm southerly air flow, we noted a major influx of migrants on the ridgeline. We captured >100 birds of 20 species using 13 nets for less than 4 hours. We observed hundreds of birds moving through the forest, with activity especially prominent about two hours after dawn. In 1995, despite netting on 4-5 mornings per week into mid-October, we did not observe a similar large influx of passage migrants. We did note that berry crops, especially of mountain ash (*Pyrus americana*), were abundant in 1994 and scarce in 1995. While it is possible that the influx of migrants we observed in 1994 may have sought out the food resources on Mt. Mansfield's ridgeline after making dawn landfall in other habitats, we suspect that we witnessed a true "fall out" event. However, we do not know whether this was an isolated, atypical occurrence, or whether fluctuating food resources in subalpine forests may determine their use by fall migrants. More detailed data collection over a longer time period will be necessary to examine the stopover ecology of migrant landbirds at high elevations.

Our searches of areas below transmission towers on Mt. Mansfield and Mt. Ascutney yielded only three dead birds. On Mt. Mansfield a Myrtle Warbler was found on 12 October, and a Hairy Woodpecker was found on 1 August. A Blackpoll Warbler was found dead on Mt. Ascutney on 21 September under the lower elevation tower. Although preliminary evidence suggests that high elevation communications towers may not be a significant source of mortality to migrating landbirds, we believe that more data are needed. We plan to expand our searches on Mt. Mansfield to include several other towers in 1996.

Future Plans

We plan to continue operation of the fall migration banding station on Mt. Mansfield, with an increase in the number of mist nets used to 20. We will expand the communications tower mortality study on Mt. Mansfield to include several additional existing towers south of the "Forehead". An effort will be made to enlist volunteer observers to conduct regular surveys below towers on other Vermont peaks during the fall of 1996.

Acknowledgments

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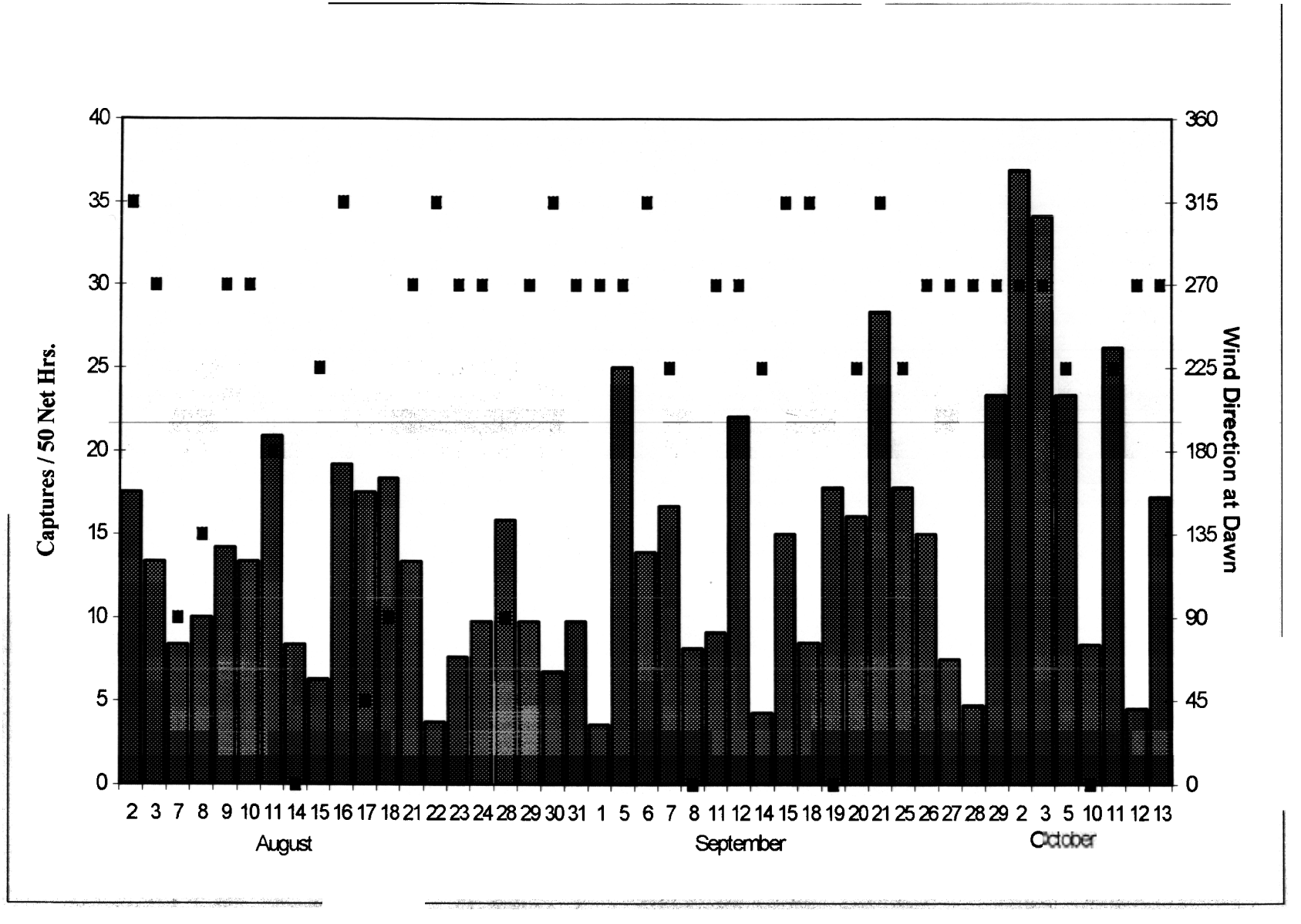

Figure 1. Number of captured individuals each day per 50 net hours (left axis, bars) and wind direction at sunrise (right axis, squares).

Table1. Fall migrant capture data presented by month and age on Mt. Mansfield, Vermont, 1995.

	August				September				October				Grand Total
Species	0	1	2	Total	0	1	2	Total	0	1	2	Total	
Myrtle Warbler	1	8	16	25	1	13	63	77	1	12	53	66	168
Blackpoll Warbler	0	7	54	61	0	44	31	75	1	0	0	1	137
Slate-colored Junco	0	0	23	23	0	6	36	42	0	24	18	42	107
Ruby-crowned Kinglet	0	2	3	5	1	20	23	44	30	1	13	44	93
Black-throated Blue Warbler	2	2	42	46	1	1	26	28	1	0	0	1	
Golden-crowned Kinglet	0	1	5	6	1	1	26	28	9	1	25	35	69
White-throated Sparrow	0	4	7	11	0	14	18	32	13	0	7	20	63
Black-capped Chickadee	1	0	1	2	3	0	20	23	0	0	6	6	31
Black-thr. Green Warbler	0	1	9	10	0	0	8	8	0	0	0	0	18
Ovenbird	0	0	11	11	0	1	4	5	0	0	0	0	16
Swainson's Thrush	0	1	4	5	0	1	9	10	0	0	0	0	15
Magnolia Warbler	0	1	5	6	0	1	6	7	0	0	0	0	13
Red-breasted Nuthatch	0	5	3	8	0	3	0	3	0	0	1	1	12
Hermit Thrush	0	1	1	2	1	0	0	1	0	5	4	9	12
Red-eyed Vireo	0	0	3	3	0	0	9	9	0	0	0	0	12
American Robin	0	1	1	2	0	0	0	0	0	4	3	7	9
Blackburnian Warbler	0	0	4	4	0	0	4	4	0	0	0	0	8
Nashville Warbler	1	0	2	3	0	1	3	4	0	0	0	0	7
Chestnut-sided Warbler	0	0	4	4	0	0	2	2	0	0	0	0	6
Black and White Warbler	0	0	5	5	0	0	1	1	0	0	0	0	6
Canada Warbler	0	1	4	5	0	0	0	0	0	0	0	0	5
Downy Woodpecker	1	1	0	2	0	1	0	1	0	1	0	1	4
Brown Creeper	0	0	0	0	0	1	1	2	2	0	0	2	4
Bicknell's Thrush	0	0	0	0	0	1	3	4	0	0	0	0	4
Rose-breasted Grosbeak	0	0	4	4	0	0	0	0	0	0	0	0	4
White-crowned Sparrow	0	0	0	0	0	1	2	3	0	1	0	1	4
Blue Jay	0	0	0	0	0	1	2	3	0	0	0	0	3
Veery	0	0	1	1	0	0	2	2	0	0	0	0	3
Solitary Vireo	0	0	0	0	0	0	3	3	0	0	0	0	3
American Redstart	0	0	3	3	0	0	0	0	0	0	0	0	3
Purple Finch	0	1	2	3	0	0	0	0	0	0	0	0	3
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	2	0	0	2	2
Hairy Woodpecker	0	0	0	0	1	0	1	2	0	0	0	0	2
Northern Flicker	0	0	0	0	0	2	0	2	0	0	0	0	2
Yellow-bellied Flycatcher	0	0	1	1	0	0	1	1	0	0	0	0	2
Winter Wren	0	1	1	2	0	0	0	0	0	0	0	0	2
Cedar Waxwing	0	2	0	2	0	0	0	0	0	0	0	0	2
Yellow Palm Warbler	0	0	0	0	0	0	0	0	0	0	2	2	2
Mourning Warbler	0	0	2	2	0	0	0	0	0	0	0	0	2
Song Sparrow	0	0	2	2	0	0	0	0	0	0	0	0	2
Lincoln Sparrow	0	0	0	0	0	0	2	2	0	0	0	0	2
Baltimore Oriole	0	0	2	2	0	0	0	0	0	0	0	0	2
Sharp-shinned Hawk	0	0	0	0	0	0	1	1	0	0	0	0	1

Table 2. Continued.

Species	August				September				October				Grand Total
	0	1	2	Total	0	1	2	Total	0	1	2	Total	
White-breasted Nuthatch	0	0	0	0	0	0	1	1	0	0	0	0	1
American Pipit	0	0	0	0	0	0	1	1	0	0	0	0	1
Tennessee Warbler	0	1	0	1	0	0	0	0	0	0	0	0	1
Northern Parula	0	0	0	0	0	0	1	1	0	0	0	0	1
Bay-breasted Warbler	0	0	0	0	0	0	1	1	0	0	0	0	1
Common Yellowthroat	1	0	0	1	0	0	0	0	0	0	0	0	1
Chipping Sparrow	0	0	1	1	0	0	0	0	0	0	0	0	1
White-winged Crossbill	0	0	1	1	0	0	0	0	0	0	0	0	1
Total Captures	7	41	227	275	9	113	311	433	59	49	132	240	948
Total Net Hrs.	1088				1450.5				576				3114.5
Captures/500 Net Hrs.	3.2	18.8	104.3	126.4	3.1	39.0	107.2	149.3	51.2	42.5	115.0	208.3	152.2

Literature Cited

Moore, F.R. and T.R. Simons. 1992. Habitat suitability and stopover ecology of neotropical landbird migrants. Pages 143-171 in Ecology and Conservation of Neotropical Migrant Landbirds, Hagan, J.M. and D.W. Johnston, eds. Washington: Smithsonian Inst. Press.