Table 5: Mean May arrival dates of the 14 century club species (see text) at SWAMP. It shows the P-value comparing the mean arrival date for each year to the other years,

* signify statistically significant differences at the P<0.05 level (two-tailed t-tests).

Species	Mean May Arrival date (2003)	Mean May Arrival Date (2004)	Mean May Arrival Date (2005)	P-value (2003 vs 2004)	P-value (2003 vs 2005)	P-value (2004 vs 2005)
GRCA	16.18 ± 0.75	13.39 ± 1.061	18.25 ± 0.703	0.0114*	0.0082*	0.0001*
MOWA	24.23 ± 0.84	20.44 ± 0.984	24.5 ± 1.058	0.0005*	0.7512	0.0008*
NOWA	13.4 ± 0.46	11.79 ± 0.719	14.53 ± 0.649	0.0289*	0.0165*	0.0001*
OVEN	15.41 ± 0.616	12.87 ± 0.575	16.49 ± 1.002	0.0001*	0.0850	0.0010*
RCKI	5.53 ± 0.65	2.08 ± 0.753	9.66 ± 0.521	0.0008*	0.0001*	0.0001*
SWTH	19.52 ± 0.707	16.72 ± 0.436	20.85 ± 0.730	0.0001*	0.0650	0.0001*
WTSP	8.55 ± 0.513	7 ± 0.539	9.71 ± 0.759	0.0559	0.5180	0.0019*
WIWA	21.29 ± 0.882	16.68 ± 1.259	20.10 ± 0.573	0.0018*	0.1890	0.0001*
COYE	17.91 ± 0.886	14.77 ± 1.192	17.50 ± 1.543	0.0134*	0.6498	0.0811
CAWA	22.14 ± 0.576	20.7 ± 0.765	22.00 ± 0.735	0.0681	0.8459	0.0827
VEER	19.03 ± 1.098	14.96 ± 0.798	16.72 ± 0.989	0.0001*	0.0441*	0.0877
GCTH	18.89 ± 1.889	15.62 ± 1.145	17.67 ± 1.273	0.0085*	0.7321	0.1192
MAWA	18.56 ± 0.513	19 ± 0.539	17.42 ± 0.417	0.4152	0.0380*	0.0004*
AMRE	16.79 ± 0.715	19.18 ± 0.573	18.03 ± 0.447	0.0001*	0.0901	0.0123*

Note: The Alpha codes used for the birds in Figures 3 and 4 and Table 5 are as follows: GRCA=Gray Catbird, MOWA=Mourning Warbler, NOWA= Northern Waterthrush, OVEN=Ovenbird, RCKI=Ruby-crowned Kinglet, SWTH=Swainson's Thrush, WTSP=White-throated Sparrow, WIWA= Wilson's Warbler, COYE= Common Yellowthroat, CAWA=Canada Warbler, VEER=Veery, GCTH=Gray-cheeked Thrush, MAWA= Magnolia Warbler, AMRE=American Redstart.

timing and both were cooler than 2004 and the long term mean (Figure 5). The migration in 2004 was earlier and warmer. It has been suggested that there may be a cold temperature threshold for some migratory birds; if temperatures are below this threshold, the birds remain grounded. We looked for an indication of this phenomenon by plotting daily low temperatures recorded at Chicago's O'Hare airport from mid-April through May (Figure 6). We note a protracted period of below-average daily low temperatures in late April and early May 2005, which may have grounded some birds during the early part of the migration season and caused them to arrive later to SWAMP.

One pattern that remains enigmatic is the composition of the group whose arrival date is correlated with temperature. It is not a clearly defined group in terms of taxonomy, as Swainson's Thrushes have a temperature-dependent arrival date, but Veeries don't. Similarly, some warblers showed a temperature-dependent pattern, and others didn't (Table 5). Neither does body size appear to explain which birds have temperature-dependent arrival. One might predict that because of the many physiological processes that scale with body size, body size might be correlated with temperature-dependent migratory behaviors. However, both smaller- and larger-bodied species exhibited temperature-dependent and temperature-independent arrival date patterns (Table 5). A third factor that we hypothesized might explain which birds responded to temperature was geographic wintering area. Perhaps birds coming from different areas might demonstrate different behaviors. Once again, we found no clear pattern. Both intra- and inter-continental migrants include species that exhibit both temperature-dependent and temperature-independent patterns. We therefore conclude that species respond idiosyncratically to the weather patterns that they experience en route.

Ongoing and Future Research

SWAMP is designed as a long-term monitoring/research project. We look forward to continuing our bird banding and data collection during May each year, and to continuing and expanding our research in the areas of migratory bird stopover biology and population trends.

Acknowledgements

We thank Lake Forest Open Lands Association for allowing us to conduct our study on their preserve. Blair Skinner and Rachel Gratis served as field assistants in 2002 and 2003. We also thank Dawn Hutchinson, Chris Skan, Lucy Amato, Joan Palincsar, Marion Cartwright, Tim Wallace, and all of the other volunteers who have helped SWAMP over the past four years.

Literature Cited

Ammon, E., W. Gilbert. 1999. Wilson's Warbler (Wilsonia pusilla). In the Birds of North America, no 478 (A. Poole and F. Gill, eds.) The Academy of Natural Sciences, Philadelphia, PA, and the American Or-