

NABA Butterfly Count Column

Butterflies in Synch

by Ann Swengel


The count program most effectively tracks common butterflies, as Leslie Ries showed so well in the summer 2008 count column. The analysis here also showcases what the count does best: displaying patterns for abundant and widespread species over large scales of space and time.

The graph on page 35 plots results from Dr. Walter Koenig's study of "spatial synchrony" in the *American Midland Naturalist* in 2006 (155: 39-49). He examined whether annual fluctuations in Monarch abundance are synchronized among locations, which required a number of counts from the same sites (in this case, count circles). To account for variation in how much time was spent looking for butterflies among counts, abundance was calculated as an observation rate of Monarchs per party-hour (a party-hour is an hour spent counting by one party, or group, of counters).

These "time series" of Monarch abundances were correlated between pairs of circles, for all pairings of circles with three or more of the same years in common (for 396 circles during 1977-99). Degree of correlation is calculated as a "coefficient" that ranges between 0.0 (no correlation at all) and 1.0 (perfect positive correlation) or -1.0 (perfect negative correlation). These coefficients were then examined for whether pairs closer to each other have stronger positive correlations (more similarity in up's and down's) than circles farther apart. Eastern and western Monarchs were analyzed separately, with the 105th meridian dividing the two.

Despite how variable weather can be, general trends in climatic variation are also often similar over relatively large areas, and Dr. Koenig related the considerable similarity of summer temperature over comparable distances to the Monarch's synchrony. But this didn't explain all the Monarch's synchrony. Since Monarchs migrate, mobility can coordinate with abundance widely over the landscape too.

What about rare and localized species? Since these are not as well covered by the counts, this graph compares Dr. Koenig's analysis to the Swengels' surveys of the federally endangered 'Karner' Melissa Blue, as reported in *The Great Lakes Entomologist* in 2005 (38: 135-154). Using the peak summer count at 29 sites per year during 1998-2005, this analysis had nearer sites, all within 160 miles of each other, than did the NABA count circles which must be at least 15 miles apart, but extend throughout the United States and Canada. But for the same distances apart, fairly similar results occurred for both species. The graph on page 35 plots the average coefficients for each distance category. All correlation values below 0.2 do not differ "significantly" from random (0.0), while all values higher than that do, demonstrating spatial synchrony.

This confirms what butterflies already know: butterfly species often fluctuate with amazing synchrony over remarkable distances. But for butterflies like the Karners, which typically disperse only short distances (e.g., a mile or less), much less "rescue" from other sites is available to a population when it drops to perilously low numbers. Thus, conservation actions need to maintain as large populations as possible, to increase the likelihood of surviving low years viably. 

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