

Northward Range Expansion of Subtropical Butterflies Due to Regional Warmer Winter Temperatures Related to Anthropogenic Climate Change

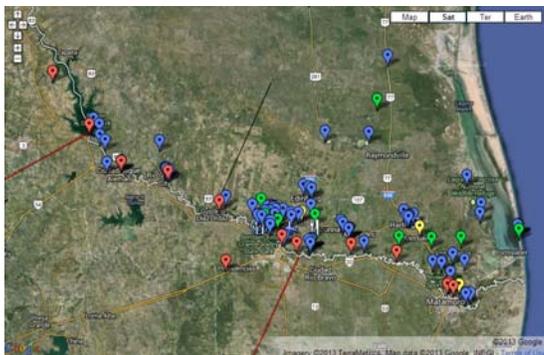
By Steven Schafersman

Scientific studies during the last two decades have documented the northward range expansion of subtropical butterflies in Europe and North America due to warmer winter weather conditions related to climate change. Among the many animals that exhibiting this, butterflies have an extensive literature documenting the trend. Why this is true is explained by a review article: “As ‘cold blooded’ animals, butterflies are particularly affected by changes in climate. Numbers are influenced every year by weather patterns but increases in mean temperatures over a sustained period can lead to significant changes in range, population size, the rate of colonisation or extinction, [phenology], number of generations each year, choice of larval foodplant and other ecological and evolutionary factors. . . . Because there is such a good data set and because of their biology, butterflies are very effective indicators of climate change. The Millennium Atlas of Butterflies in Britain and Ireland, which was the most comprehensive and intensive period of butterfly recording ever undertaken in the UK, shows very clearly that butterflies are extending their distributions northwards. . . . As well as expansions in range, there is also evidence that some species that historically have not been able to survive our winters are now doing so increasingly.”

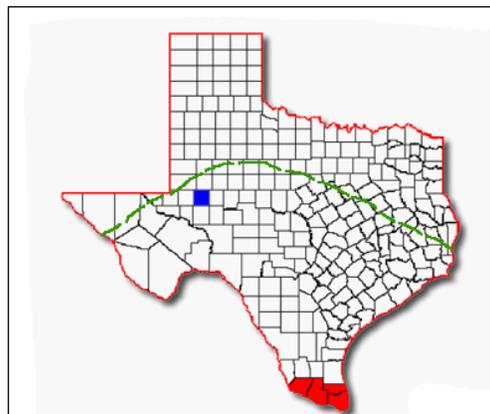
Phenology is the science dealing with the influence of climate on recurring annual phenomena of animal and plant life such as budding, migration, range expansion, larval survival, and earliest seasonal appearance. For example, studies using the detailed UK butterfly records show that, “Most resident UK butterfly species have significantly advanced their dates of first appearance during the past 30 years.” A study of two Canadian boreal butterflies shows that they “increased their northerly ranges by ~150 and 70 km, respectively. Warmer autumns and winters may be providing opportunities for range extensions of more southerly butterfly species held at bay by past climatic conditions.” There are many other examples published in scientific journals. The common thread in all of these studies is that warmer winters are responsible for the phenological trends. I have created a webpage at http://lanoestacado.org/resources/influence_climate_change/ that lists all the references.

Recent observations by several Midnats have fortuitously documented this phenomenon. Eight subtropical butterfly species that are usually found in the Lower Rio Grande Valley (LRGV) have been observed in Midland this summer. All are extremely rare in Midland and most have been seen only once before. The fact that they were observed and documented at all is due to the fact that Midland has a very small cadre of knowledgeable and experienced butterfly watchers who are out almost every week searching for them. It is possible these subtropical butterflies could be found throughout South and West Texas this year. Midnats should recollect that the winter of 2012-2013 was quite warm. I remarked to my wife that summer and fall butterflies were still flying into December and January. Spring butterflies appeared early. Finally, we and other Midnats began to find and photograph the rare subtropical LRGV butterflies in Midland during the 2013 summer.

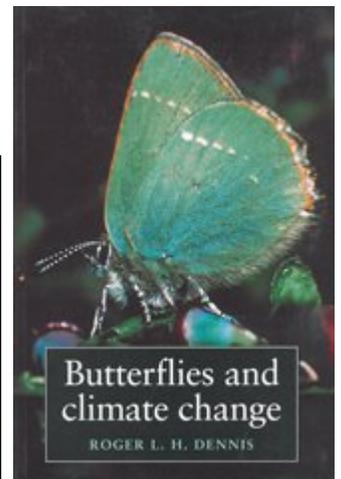
I hypothesize that the warm winter temperatures in South and West Texas are responsible for all of these anomalous phenomena. Numerous scientific studies have shown that anthropogenic climate change is responsible for regional global warming. One well-studied region that is known to be warming is the southwest United States, including West Texas.



Lower Rio Grande Valley locations at which subtropical butterflies are normally found.



Subtropical butterflies are commonly found in counties (shaded red) in the LRGV. Eight species of these butterflies were found in Midland County (shaded blue) during the summer of 2013. It is possible these species have spread northward up to the green line.



“Butterflies are particularly sensitive to climate and are important ‘bio-indicators’ of climatic change. This book not only explores how butterflies adapt to climatic gradients and weather patterns, but also shows how their biogeography and evolution have responded to climate change in the past, and how they are likely to respond in the future as the enhanced greenhouse effect increasingly alters the world’s climate.” — From the book.

Eight subtropical butterflies typical of the Lower Rio Grande Valley found in Midland, Texas, during the Summer, 2013. All photos were taken in Midland by members of the Midland Naturalists.



Ruby-Spotted Swallowtail, *Papilio anchisiades*
Steven Schafersman photo

Photo of a specimen collected in 2005 by Joann Merritt from her backyard. She saw another on 2013 August 17 at same location.



White Angled-Sulphur, *Anteos clorinde*
Sybil Eberhart photo

Photo of an individual observed and photographed in Sybil Eberhart's backyard on 2013 July 27.



Mallow Scrub-Hairstreak, *Strymon istapa*
Steven Schafersman photo

Photo of an individual discovered by Gae Kovalick and Steven Schafersman in their backyard butterfly garden, 2013 August 17.



White Peacock, *Anartia jatrophae*
Steven Schafersman photo

Photo of an individual discovered by Gae Kovalick and Steven Schafersman at I-20 Wildlife Preserve, 2012 July 7. Species seen again in 2013 August by several Midnats.



Dingy Purplewing, *Eunica monima*
Sybil Eberhart photo

Photo of an individual observed and photographed by several Midnats at Goldeneye Pond in Midland on 2013 August 17.



Ruddy Daggerwing, *Marpesia petreus*
Bill Lupardus photo

Photo of an individual observed and photographed by several Midnats at I-20 Wildlife Preserve in Midland on 2013 August 18.



Tropical Leafwing, *Anaea aidea*
Steven Schafersman photo

Photo of an individual discovered by Gae Kovalick and Steven Schafersman at I-20 Wildlife Preserve on 2013 September 2.



Hammock Skipper, *Polygonus leo*
Sybil Eberhart photo

Photo of an individual observed and photographed in Sybil Eberhart's backyard on 2013 July 30.