

On polyphenism of *Eurema दौरa* in Florida

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Here, I present a short photo essay, depicting two seasonal forms of Barred Yellow butterfly, *Eurema दौरa*. Daniels (1995) suggested that the observed seasonal polyphenism "may enhance thermoregulation and/or crypsis for dry season form individuals faced with cooler conditions and distinctly different vegetative landscapes." The photographs presented here that were taken in July (A, B) and December (C, D) (see photo pp. 38) at the same hour and on the same spot support crypsis theory. The observed changes in coloration seem to also correspond to changes in behavior. While in the summer, a disturbed *E. दौरa* tends to escape into the vegetation and hide under leaves, where it can be easily mistaken for one of the numerous white flowers, the winter form seeks refuge on the ground, blending with the fallen leaves.

Brakefield and Larsen (1984) argue, that dry season and wet season divergent phenotypes of *Bicyclus* are nothing else but anti-predator adaptations. The wet season form's large eyespots, they suggest, function in the deflection of attacks, while the

dry season individuals that have small or no spots are cryptic. They note that change in this species also corresponds to behavior: wet season butterflies are more active than dry season ones and, as they put it, "reproductive success is optimized in each season by interaction of phenotype and behavior."

It has been suggested that "the phenotypic plasticity is to be expected to be built in every genome for every character since it is the primitive character that is governed by physiological processes sensitive to such environmental variables as temperature, nutrient supply, ionic environment..." Frederick Nijhout's laboratory at Duke University has been making a tremendous progress in understanding physiology of phenotypic plasticity in Lepidoptera (e.g., Rountree and Nijhout, 1995; Suzuki and Nijhout, 2008). These studies suggest that a mutation that makes the phenotype sensitive to environmental and genetic changes at a single locus can uncover cryptic genetic variation for plasticity. Nijhout's model assumes presence of selective pressure (such as predators) on continuous polygenic reaction norm,

which leads to evolution of distinct phenotypes, suggesting therefore that evolution of polyphenism is "consistent with the adaptive evolution theory." Though selectionist explanations have led evolutionary ecologists astray in the past (as it might have been the case with industrial melanism in peppered moths (Hooper, 2002)), such explanations are as highly probable, as their ecological testing is difficult.

References

- Brakefield P. M. & T. B. Larsen 1984. The evolutionary significance of dry and wet season forms in some tropical butterflies. *Biol J Linn Soc* 22: 1-12.
- Daniels J. C. 1995. Seasonal variation in the little sulphur butterfly, *Eurema lisa lisa*, in central Florida: how it compares to other sympatric *Eurema* species (Lepidoptera: Pieridae). *Holarctic Lepidoptera* 2(2): 59-65.
- Hooper J. 2002. *Of the Moths and Men: An Evolutionary Tale*. W.W. Norton & Co., 377 p.
- Rountree, D. B. & H. F. Nijhout. 1995. Genetic Control of a Seasonal Morph in *Precis coenia* (Lepidoptera: Nymphalidae). *J. Insect Physiol.* Vol. 41, No. 12, pp. 1141-1145.
- Suzuki, Y. & H. F. Nijhout. 2008. Genetic basis of adaptive evolution of a polyphenism by genetic accommodation. *J. Evol. Biol.*, 21 57-66.



Mailbag...

This is in response to the article "First Alaskan Collections of Compton Tortoiseshell" by Jordan Metzgar in the Summer 2008 issue of the News. Jordan stated that he collected *Nymphalis vau-album* at Fort Yukon, Alaska and that is the northern most collection of this species. I have collected *vau-album* at Coldfoot, Alaska. Coldfoot is along the Dalton Highway 48 miles north of the Arctic Circle,

which makes Coldfoot 40 miles farther north than Fort Yukon. The Koyukuk River runs basically south through this area. On August 13, 2005 I collected 15 specimens of *vau-album* in the Coldfoot area. The butterflies were common in the Coldfoot area. The farthest north that specimens were collected was 1.5 miles north of Coldfoot at 67°16' 35" N, 150°10' 22"W and an elevation of 1040 feet. The butterflies

were caught while visiting mud or basking on bare ground. I knew that *vau-album* had been reported from Wiseman so I thought that was a capture. However, Jordan reported in his article that it was a sighting.

The next day I collected 20 specimens 4 miles north of the Yukon River along the Dalton Highway. The butterflies were also common at this location. They were collected while basking on bare ground and while perched on leaves of birch trees.

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Seasonal forms of *Eurema daira* (Pieridae) in Florida exhibiting season-specific crypsis. ©Andrei Sourakov. See article pp. 40.

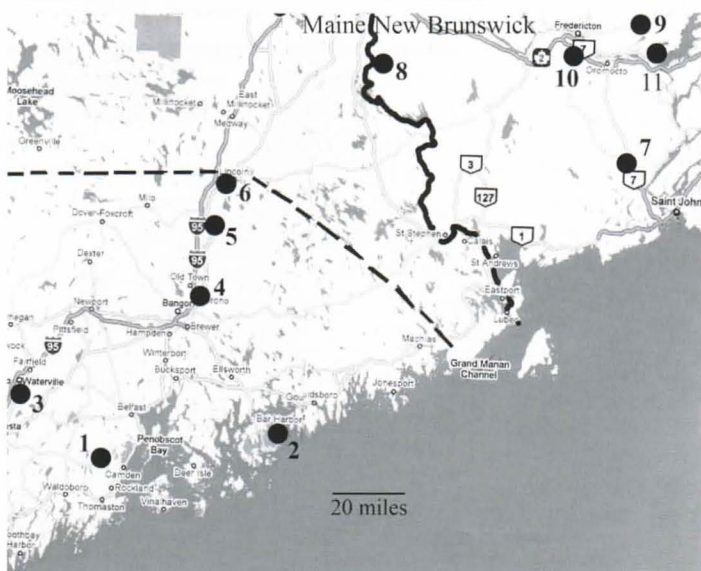
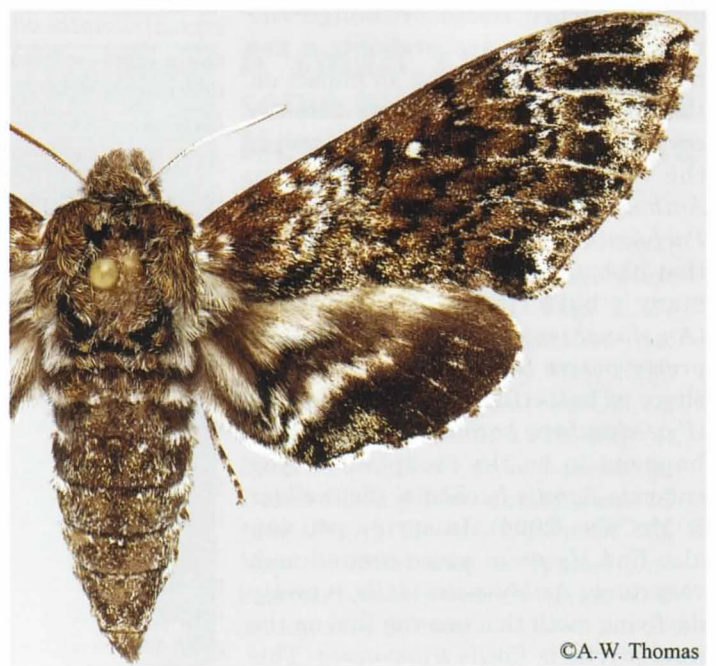


Fig. 1. Localities for Pawpaw Sphinx (*Dolba hyloeus*) in east central Maine (Brower 1974); and for recent collections in southwestern New Brunswick. **Fig. 2.** *D. hyloeus* specimen 1 October 2002 in New Brunswick (Fig. 1, site 7). See article pp. 34.



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