



Sustainability and the Poey butterfly

Southeast Florida is home to the butterfly species *Eumaeus atala*, also known as the poey butterfly. Seasonal conditions of Southeast Florida change the butterflies' development. Seasonal polyphenisms for *E.atala* may include increased survival through thermoregulation, cryptic coloration, as well as better mating success because of enhanced wing patterns in adults (Koi et al., 2017).

Sustainability is defined as maintaining conditions under which humans and their environment can coexist in a way to support present and future generations (“Learn about Sustainability”, 2020). Our interactions with our physical environment have imposed changes on the natural developmental processes. Polyphenism describes expression of distinct phenotypes from the same genetic background that has been induced by environmental factors (Yang et al. 2019). As organism develop under different conditions, a single genotype can produce distinctive phenotypes through changes in gene expression without changing the DNA sequence



Figure 1. Different phenotypes of the *E. atala* butterfly.

Blue vs. Green Phenotypes

- **Blue iridescent inner wing phenotype** - Males that exhibit phenotype have shown to have higher mate recognition. In addition, the color functions as an aposematic signal to predators (Koi et al., 2015). Blue phenotypes are associated with warmer temperatures, in which butterflies have a slightly higher survival rate (Koi et al., 2017).
- **Green inner wings**- Experiments have shown that males that exhibit this green inner wing phenotype are more likely to be born in winter months and have a slightly lower survival rate than the butterflies that are born in the warmer seasons (Koi et al., 2017).

Can Urbanization Save the Poey Butterfly?

Pros of Urbanization	Cons of Urbanization
<ul style="list-style-type: none"> • A Decrease in the amount of run-off that is harmful to the butterfly species (Koi et al., 2017) • Increase use of artificial fertilizers can lead to an increase in available host plants (Koi et al., 2017) 	<ul style="list-style-type: none"> • Decrease in biodiversity • Increase use of pesticides • Increasing human interaction with the species • Increase in air pollution



Figure 2. Phenotype of outer wing of *E.atala*

Final Standing: Although urbanization does exhibit benefits for the *E. atala*, urbanization will be detrimental to many other species. Therefore, urbanization is not the best strategy for this species' preservation. As alternative, environmentalist can work on preserving more host species, that are also

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