

# Skipping meals may affect butterfly wing size, coloration

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This is a female monarch. Credit: Pat Davis

High food stress may impact wing size and coloration—both indicators of migratory success—in monarch butterflies, according to results published April 2, 2014, in the open access journal *PLOS ONE* by Haley Johnson from University of Jamestown and colleagues.

Monarch butterflies migrate long distances according to the seasons every year. Because this requires so much energy, they rely on access to food during early stages of growth so that they can develop the necessary characteristics to safely complete the trek, including appropriate wing shape and coloration. To better understand the effects of food on growth, the authors of this study deprived late-stage larvae of milkweed and later measured the effect on the adults' wing size and coloration. The three test groups were those with no food restriction, those with 24-hour food restriction (low-stress), or those with 48-hour restriction (high stress). After metamorphosis, scientists imaged and analyzed the forewing length, width, and surface area, as well as the brightness of the orange wing pigment and the intensity of black pigment.

Although the effects on wing color and shape were unclear, the authors found that two days of larval [food restriction](#) may have caused a small but clear reduction in adult wing size, by approximately 2%. Limited access to milkweed stunts monarch wings, which could ultimately result in lower migration success. The authors also found that the quality of wing pigmentation in [monarch butterflies](#) was partly influenced by larval food supply, although the effects were ambiguous and require further study. Similarly, the effect on wing shape was also not easily-interpretable.

Co-author Andy Davis added, "There is increasing scientific and public concern over the loss of milkweeds throughout the range of monarchs in North America. Our study provides some answers to what can happen when monarch caterpillars run low on food"

**More information:** Johnson H, Solensky MJ, Satterfield DA, Davis AK (2014) Does Skipping a Meal Matter to a Butterfly's Appearance? Effects of Larval Food Stress on Wing Morphology and Color in Monarch Butterflies. *PLoS ONE* 9(4): e93492. [DOI: 10.1371/journal.pone.0093492](#)

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