

Abstract Submitted
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Scales affect performance of Monarch butterfly forewings in autorotational flight¹ ANYA DEMKO, Reed College, AMY LANG, University of Alabama — Butterfly wings are characterized by rows of scales (approximately 100 microns in length) that create a shingle-like pattern of cavities over the entire surface. It is hypothesized that these cavities influence the airflow around the wing and increase aerodynamic performance. A forewing of the Monarch butterfly (*Danux plexippus*) naturally undergoes autorotational flight in the laminar regime. Autorotational flight is an accurate representation of insect flight because the rotation induces a velocity gradient similar to that found over a flapping wing. Drop test flights of 22 forewings before and after scale removal were recorded with a high-speed camera and flight behavior was quantified. It was found that removing the scales increased the descent speed and decreased the descent factor, a measure of aerodynamic efficacy, suggesting that scales increased the performance of the forewings.

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