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The Effects of Scales on Autorotation of Monarch Butterfly Forewings[1] NICOLE DECHELLO, Smith College, AMY LANG, University of Alabama — The wings of Monarch butterflies (*Danus plexippus*) have scales of approximately 100 micrometers that cover their wings in a roof-shingle pattern, and these scales are hypothesized to help improve flight efficiency for their long migration. The aerodynamic effects of the scales, particularly involving the leading edge vortex formation and resulting lift, were investigated by observing the natural autorotation of forewing specimen when dropped in quiescent air. A high-speed camera recorded drop tests of 32 forewings both with scales and after removal of the scales. It was found that the scales, on average, comprised 17% of the forewing mass. Tracking software was used to analyze the videos for several parameters, including descent speed and radius of rotation.

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