

Abstract Submitted
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The effect of wing stroke and aspect ratio on the force generation a compliant membrane flapping wing COSIMA SCHUNK, SHARON M. SWARTZ, KENNETH S. BREUER, Brown University — Aspect ratio is one parameter used in efforts to predict a bat species' flight performance based on wing shape. Bats with high aspect ratio wings are expected to have superior lift-to-drag ratios and therefore to fly faster or be able to sustain longer flights. In contrast, bats with lower aspect ratio wings are usually thought to exhibit higher maneuverability. These assumptions are often based on fixed-wing aerodynamic theory, and do not take the wide variation in flapping kinematics observed in bats into account. To examine the influence of different stroke patterns, we measure lift and drag of highly compliant membrane wings with different bat-relevant aspect ratios. A two degree of freedom shoulder joint allows for independent control of flapping amplitude and wing sweep. We test five models with the same variations of stroke patterns, flapping frequencies, and wind speeds.

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