
Flight mechanics of small insects with bristled wings: current status

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Abstract

Contemporary small insects with less than 1 mm body size derived from their ancestors during the evolutionary process of miniaturization. Many of them possess wings of peculiar shapes that superficially resemble bird feathers. The function and possible advantages of this trait remained poorly understood for decades, for the lack of suitable measurement instruments and analytical techniques. But now they are a subject of intensive multidisciplinary scientific exploration. I will provide a brief overview of past several years of research on the biomechanics of flight of bristle-wing insects. The talk will focus on the aerodynamics but will not be limited to it. Wing morphology and kinematics representative of different families will be described. Aerodynamic mechanisms will be discussed and then analyzed jointly with the structural mechanical properties. The analysis will provide estimates of miniaturization limits from the standpoint of flight mechanics.

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