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**On passive wing response in flapping flight** ALBERT MEDINA, JEFF D. ELDREDGE, University of California, Los Angeles — The aerodynamic role of passive wing mechanics in biological flight remains poorly understood. This computational and experimental study focuses on the effects of flexibility on flapping foils. Our approach recognizes that deflections of insect wings primarily occur along major flexion lines, and therefore focuses on simplified wings with discrete rigid structures. In two-dimensional numerical simulations a wing consisting of rigid elliptical bodies connected by torsion springs is subjected to various acceleration profiles. Both the early-time behavior and sustained vortex shedding are investigated, and compared with an analogous rigid wing. It is found that the vortex shedding period is reduced with decreasing spring stiffness. These results are presented in the general context of vortex-induced vibrations. Our experiments focus on a dynamically scaled three-dimensional fruitfly wing in which we isolate deflection to flexion lines running largely spanwise or chordwise. We observe that previously-observed phenomena of the leading-edge vortex, such as vortex bursting, are affected by the passive response of the wing structure. Chordwise flexion has a significantly greater impact on this behaviour compared to spanwise flexion.

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