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The mechanics of pollination by wind: is anemophily aeroelastically optimized for reproduction? DAVID TIMERMAN, Department of Biology, Concordia University, Montreal, QC, DAVID F. GREENE, Department of Geography, Concordia University, Montreal, QC, JOSEF D. ACKERMAN, Department of Integrative Biology, University of Guelph, Guelph, ON, JAVIER URZAY, Center for Turbulence Research, Stanford University, Stanford, CA — Approximately 10 percent of plant species rely on wind for pollination (anemophily). These include many taxa of economic importance: e.g. cultigens such as wheat and maize; species like grasses and ragweed that trigger allergies; and the conifers, our most important species for the forest industry in the mid- latitudes. It has often been assumed that anemophily is an inefficient mechanism compared to animal pollination (zoophily), but very little is known about the forces and micromechanics that deliver pollen grains into wind streams. Here we ask a fundamental question: is anemophily optimized for pollen shedding? In this talk, we focus on an as-yet rudimentary theory of turbulence- initiated pollen shed that models the pollen-bearing stamen as an aeroelastic oscillator. Ongoing experiments with anemophilous and zoophilous flowers excited by shakers are analyzed to extract values of damping ratios, adhesion forces and flexural rigidities. Finally, the anatomical differences between anemophilous and zoophilous species are evaluated using a dimensionless number that measures the ratio of adhesion to aeroleastic forces.

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