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Parachuting with bristled wings VISHWA KASOJU, ARVIND SANTHANAKRISHNAN, Oklahoma State University, MICHAEL SENTER, KRISTEN ARMEL, LAURA MILLER, University of North Carolina — Free takeoff flight recordings of thrips (body length <1 mm) show that they can intermittently cease flapping and instead float passively downwards by spreading their bristled wings. Such drag-based parachuting can lower the speed of falling and aid in long distance dispersal by minimizing energetic demands needed for active flapping flight. However, the role of bristled wings in parachuting remains unclear. In this study, we examine if using bristled wings lowers drag forces in parachuting as compared to solid (non-bristled) wings. Wing angles and settling velocities were obtained from free takeoff flight videos. A solid wing model and bristled wing model with bristle spacing to diameter ratio of 5 performing translational motion were comparatively examined using a dynamically scaled robotic model. We measured force generated under varying wing angle from 45-75 degrees across a Reynolds number (Re) range of 1 to 15. Drag experienced by the wings decreased in both wing models when varying Re from 1 to 15. Leakiness of flow through bristles, visualized using spanwise PIV, and implications for force generation will be presented. Numerical simulations will be used to investigate the stability of free fall using bristled wings.

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