Aerodynamics of a comb-like plate mimicking a fairyfly wing

SE-UNGHUN LEE, CHEOLGYUN JUNG, DAEGYOUM KIM1, KAIST — There have been many studies on the aerodynamics of a wing with smooth surface in a wide range of the Reynolds number. Unlike smooth wings of common insects or birds, however, fairyfly has a distinctive wing geometry; a frame with several bristles. Motivated by the peculiar wing geometry of the fairyfly we experimentally investigated the fluid dynamics of a translating comb-like wing in a wide range of Reynolds number in $O(1) - O(10^3)$. We conducted the same experiment in several fluids of different viscosities in order to investigate the effects of the Reynolds number on the aerodynamic performance. Aerodynamic force of various wing shapes was measured, and it was correlated with the flow structure generated by the wing.

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Date submitted: 01 Aug 2016

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