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Macroscopic drop impacts with inclined flexible fibres[1] SALOME HUSSEIN, STUART BRADLEY, GEOFF WILLMOTT, MATHEU BROOM, University of Auckland, AUTONOMOUS ORCHARD ROBOTICS COLLABORATION — The impact of drops on flexible surfaces and structures of comparable size to the drops is an active and open field of inquiry. This situation arises in horticulture because of the spray application of pollen in solution or other substances. For example, kiwifruit vines are relatively undesirable to bees, making natural pollination unreliable. Unfortunately, current methods for artificial pollination are incredibly inefficient – sometimes wasting the majority of harvested pollen, an expensive substance to collect, process, and store. A study was therefore done on the interaction of droplets with relevant structures on the kiwifruit blossom. The impact of drops upon stigma at different speeds and angles was recorded with a high-speed camera. Several observed categories of impact phenomena are described here, along with comparisons to predictions from theoretical models of simpler situations with similar geometry and length scales. Some phenomena can be approximated as impacts with a cantilevered elastic beam, which allows one to make quantitative measurements of mass and momentum transfer from drop to structure. The results demonstrate how critical the fluid properties are to useful interactions between the applied solution and flower anatomy with different wetting morphologies.

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