Supplementary Information for:

Dynamics of Splashed Droplets Impacting Wheat Leaves

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1 Measuring the size of sprayed fungicide droplets

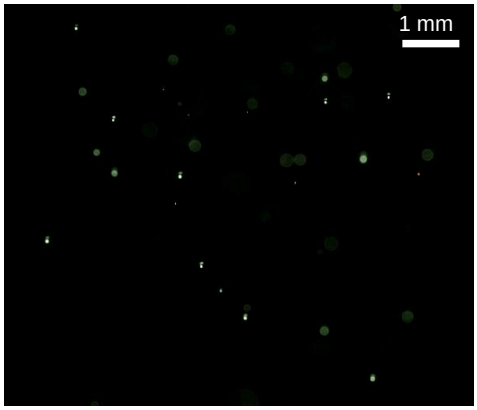

Figure S1: Photograph of airborne droplets containing the fungicide solution. The characteristic droplet diameter was approximately 70–100 μm.

2 Measuring the size of splashed satellite droplets.

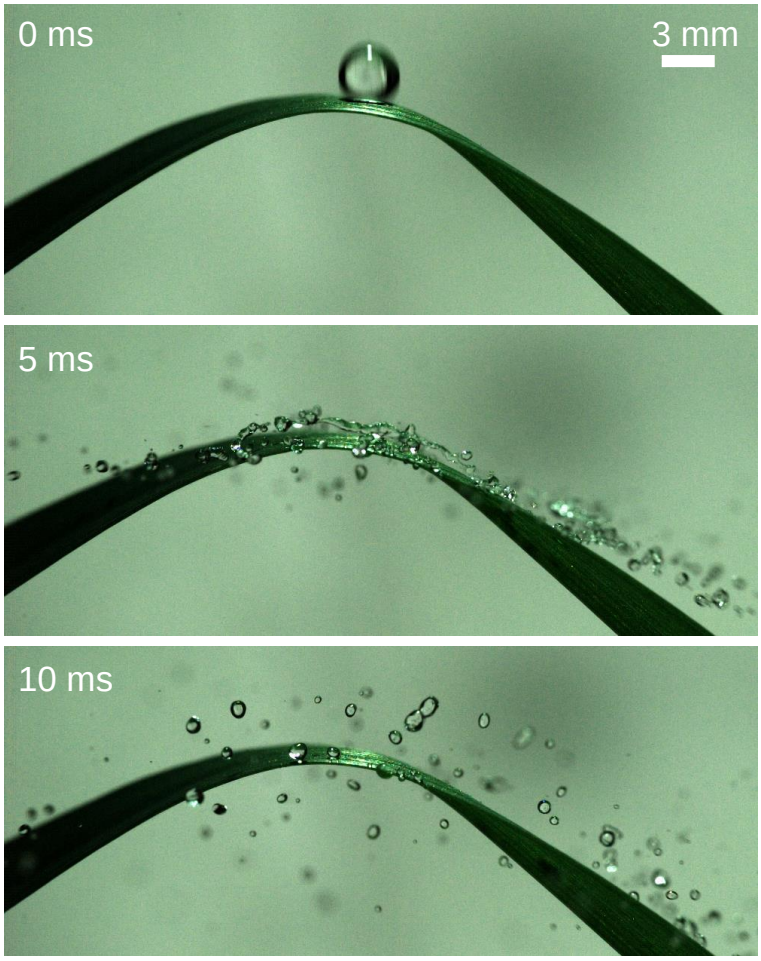

Figure S2: Side-view of high-speed photography of a 2.88 mm diameter droplet impacting a wheat leaf at a speed of $U_\mathrm{i} = 6\,\mathrm{m/s}$. This impact speed mimics that of real raindrops (4–10 m/s). The resulting splash produced satellite droplets whose diameter is in the range of $D \approx 500$–$1{,}000\,\mu\mathrm{m}$. This was used as a guideline when choosing the wire mesh used to generate satellite droplets for the results shown in the main manuscript. By using a mesh to generate satellite droplets, the mother droplet could be released much closer to the surface for more controlled experimentation.

3 SEM images of untreated and fungicide sprayed leaves

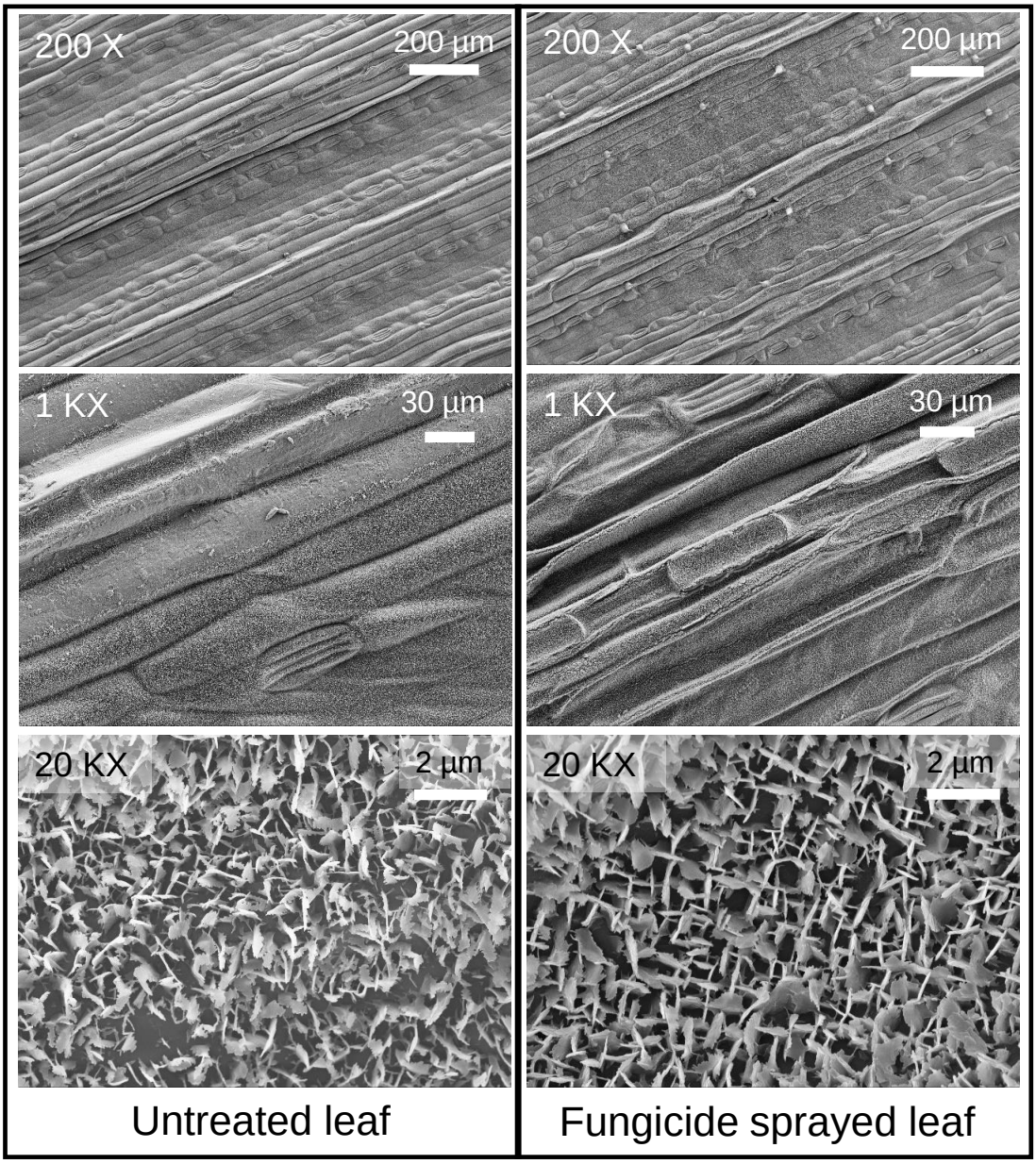

Figure S3: Scanning electron micrographs of untreated wheat leaves (left images) versus leaves sprayed with fungicide (right images). Three different magnifications were used to show that the fungicide spray did not appreciably alter the leaf morphology.

4 Static and dynamic contact angle measurements

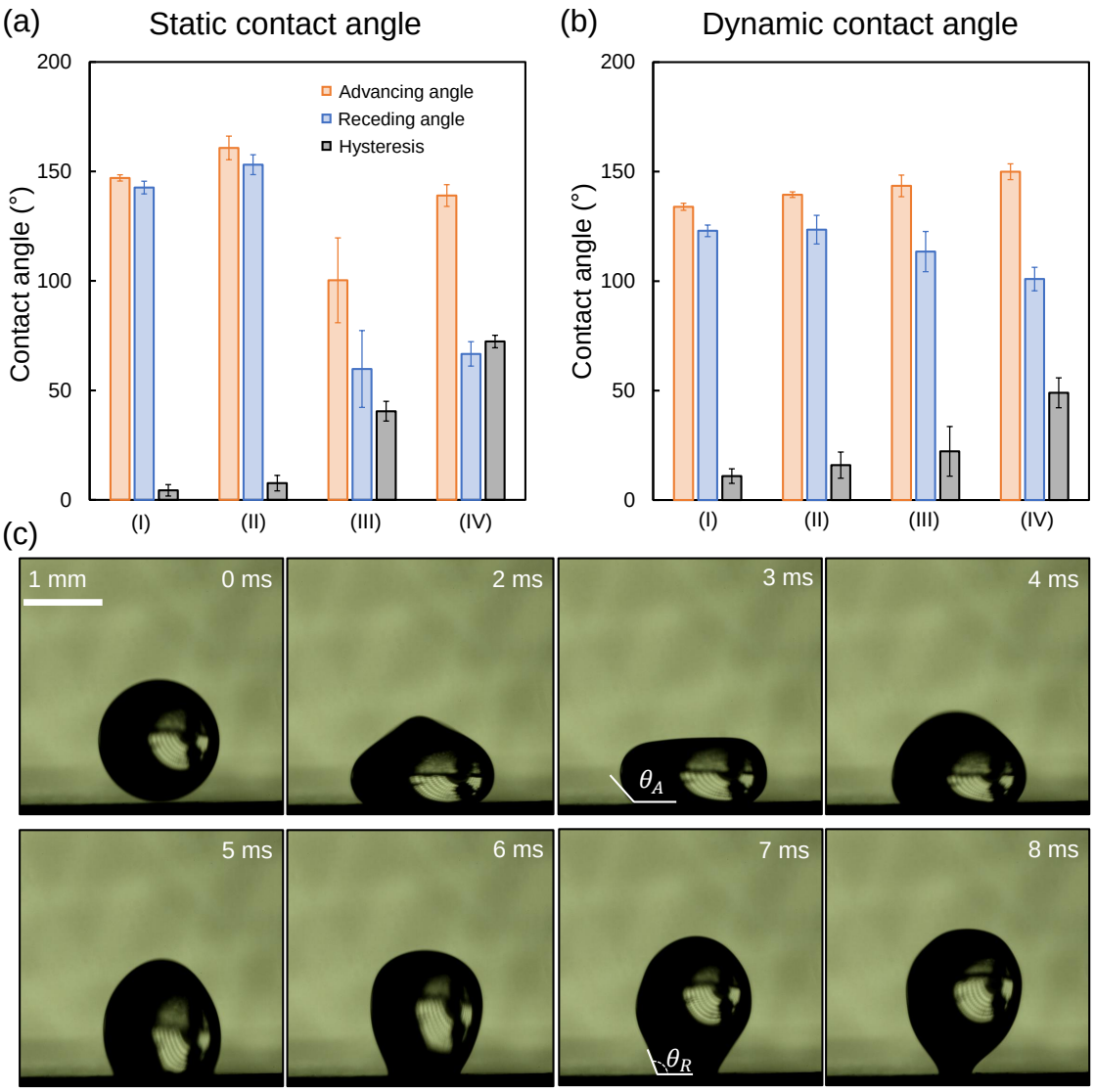

Figure S4: **(a)** The same advancing and receding apparent contact angles as shown in Figure 2b, now compared to **(b)** the contact angles of dynamic droplets. The dynamic contact angles were obtained by using side-view high-speed imaging and measuring the advancing angles during droplet impact and the receding angles during droplet retraction. **(c)** Time-lapse images of a droplet impacting a untreated leaf surface. The contact angles of dynamic droplet were measured with $[D_\mathrm{d}, U_\mathrm{d}] = [1.2$ mm, 0.6 m/s] where D_d, U_d are the diameter and velocity of an impacting drop, respectively. The advancing contact angle was measured when the droplet almost reached the maximum spreading diameter(see 3 ms) and the receding angle was measured when the droplet started to recede (see 7 ms)

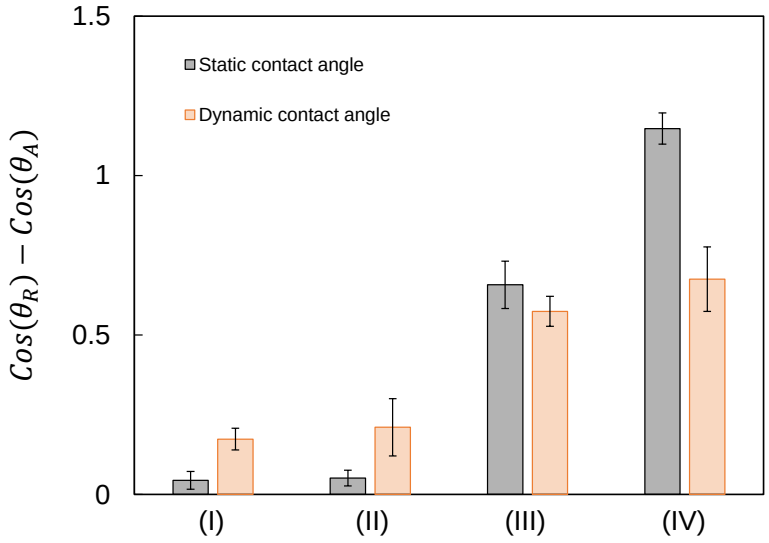

Figure S5: Comparison of the contact angle hysteresis of static versus dynamics droplets. For untreated leaves (I and II), the hysteresis was markedly higher for impacting droplets, indicating a partial wetting transition. Therefore, the dynamic angles were used to estimate the pinning force for the bouncing versus sticking model. For the fungicide sprayed leaf with parallel ridges (III), the static and dynamic values were the same within uncertainty. This demonstrates that the hysteresis of the sprayed leaf is primarily due to its chemical deposits, as opposed to an impact-induced wetting transition. Therefore, the static angles were used for (III) for the model, as the swell-shrink method is a more accurate means of contact angle measurement than the dynamic method. Finally, no bouncing was observed for leaf type (IV), so the contact angles were not directly used in the model. We expect the reduction in hysteresis for the dynamic case compared to the static case is not physical. The disparity is more likely due to random variations in leaf samples and fungicide spray conditions.

5 Video Captions

Video 1: Side-view high-speed video of satellite droplets impacting four different types of leaf surfaces (I–IV). The videos are captured at 2,000 fps and played back at 30 fps (66.7× slow motion).

Video 2: Top-view high-speed video of satellite droplet impacting untreated wheat leaf surfaces. The videos are captured at 2,000 fps and played back at 30 fps (166.7× slow motion).