



Supplement of

Acoustic levitation of pollen and visualisation of hygroscopic behaviour

Sophie A. Mills et al.

Correspondence to: Francis D. Pope (f.pope@bham.ac.uk)

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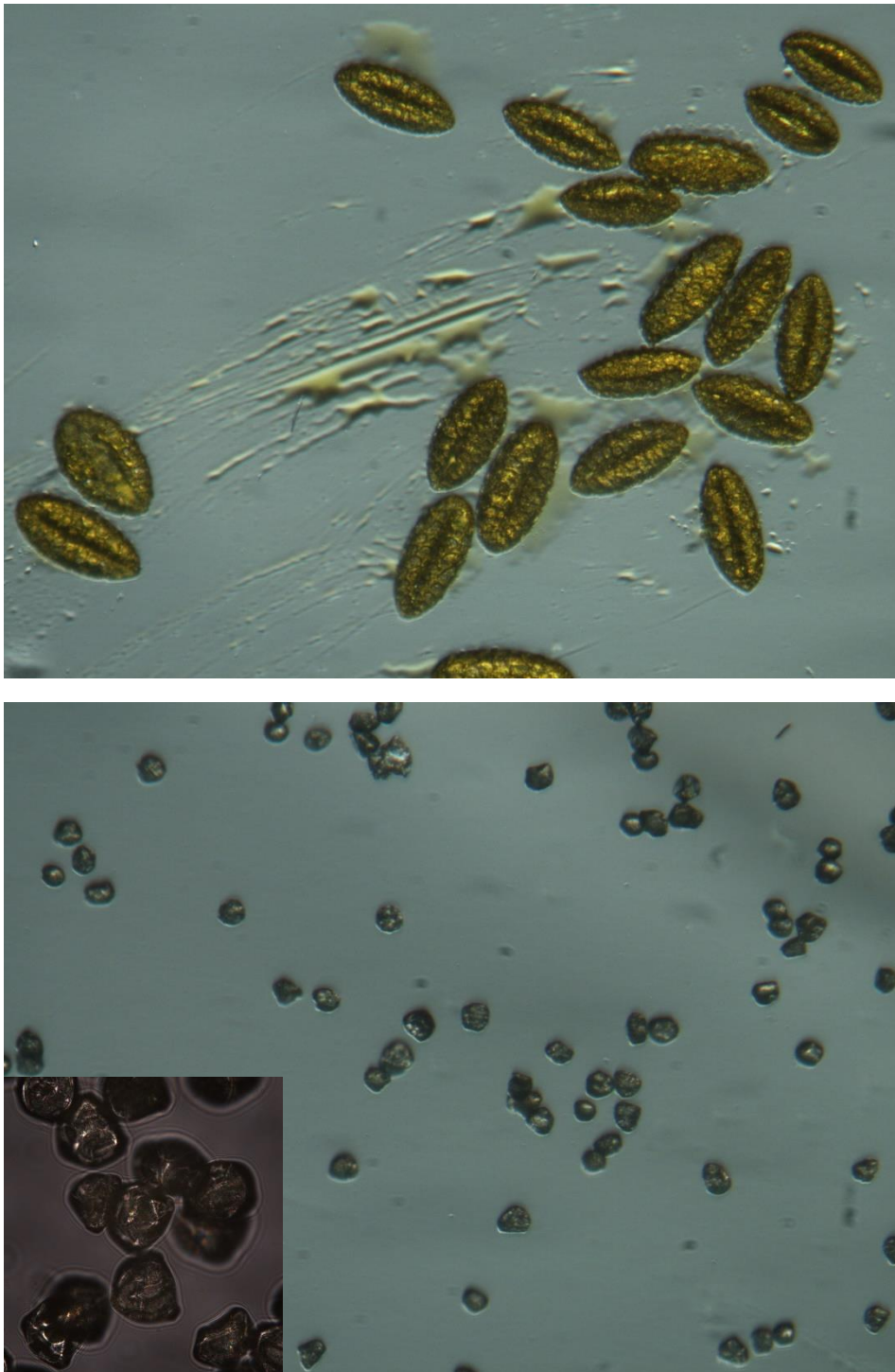


Figure S1: Microscope images of pollen grains (above: *Liliun orientalis*; below: *Populus deltoides*) from the samples used in this work. Size measurements were made under the microscope for each type, as reported in section 2.1 of the manuscript. The *Liliun orientalis* pollen from fresh flowers had polar and equatorial diameters ranging between 92-122 μm and 43-67 μm , with means of 108.6 and 50.9 μm respectively. The *Populus deltoides* was measured to have diameters across multiple axes ranging between 18 and 32 μm , with a mean of 24.8 μm .

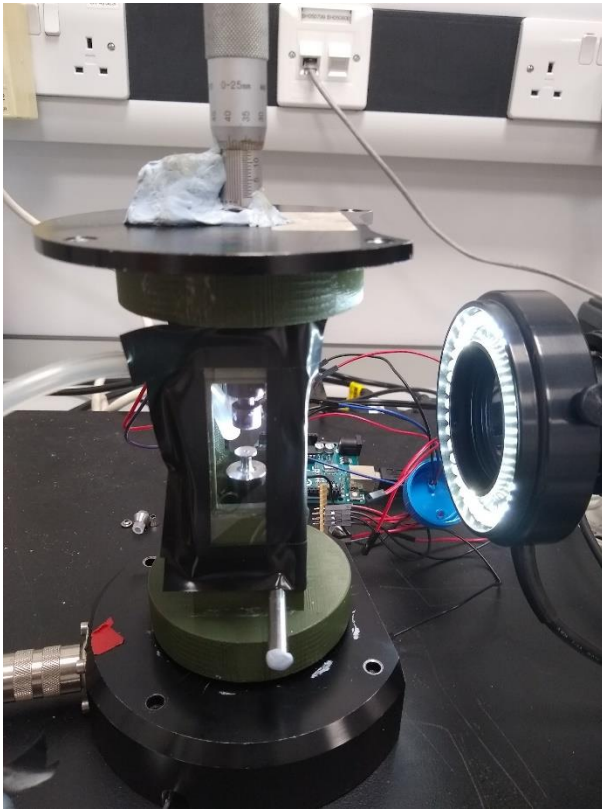


Figure S2: Photograph of the acoustic levitator chamber and macroscope used in this study.

Determining the pollen grain size

Python code adapted from:
<https://www.pyimagesearch.com/2016/03/28/measuring-size-of-objects-in-an-image-with-opencv/>

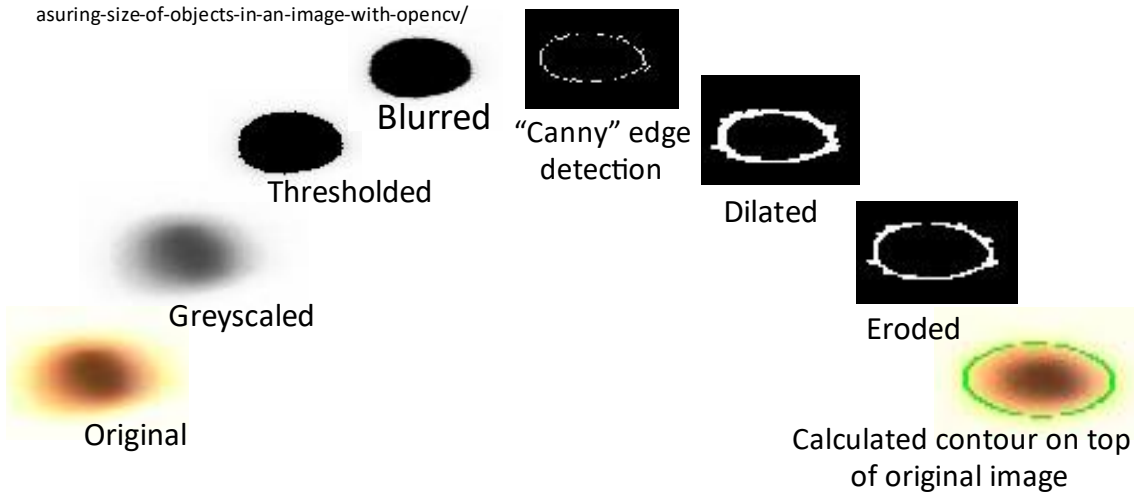


Figure S3: Methodology of the python program designed to draw contours around the pollen grains in each image.

Surface-fixed *Lilium orientalis* pollen

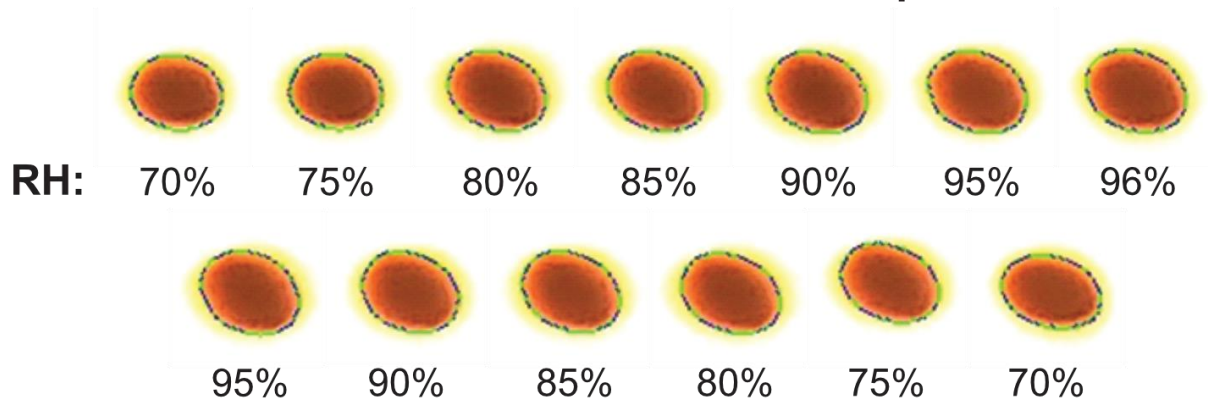


Figure S4: Example snapshots of surface-fixed *Lilium orientalis* pollen grains undergoing increasing and decreasing relative humidity changes between 70 and 96%. Blue pixels denote the contour which the program outlined and the area was determined from while the green visualises the ellipse fitted in each case and from which 'polar' and 'equatorial' diameters were determined. This demonstrates the consistency of the pollen grain silhouettes in the surface-fixed state.

Levitated *Populus deltoides* pollen

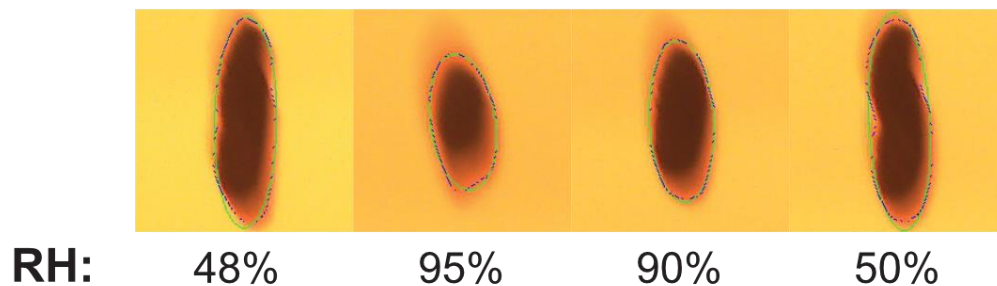


Figure S5: Example snapshots of levitated *Populus deltoides* pollen grains undergoing increasing and decreasing relative humidity changes between 48 and 95%. Blue pixels denote the contour which the program outlined and the area was determined from while the green visualises the ellipse fitted in each case and from which 'polar' and 'equatorial' diameters were determined. This demonstrates the large variance in silhouette observed in the levitated state due to the instability and frequent movement of the pollen grains.