

Supplementary Figures, Table, and Legends

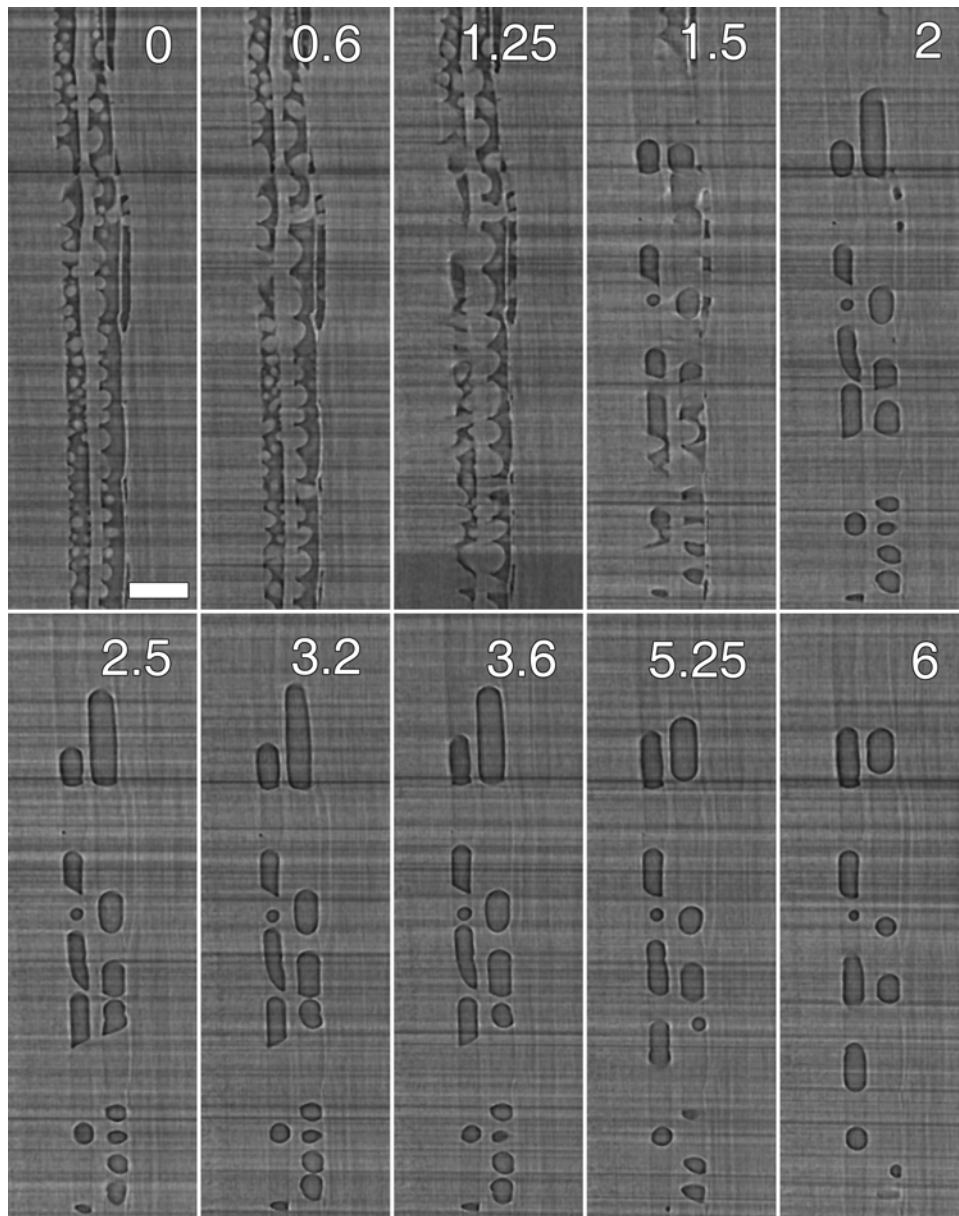


Figure S1. Longitudinal HRCT refilling time series showing the compression and dissolution of gas bubbles in the xylem. Over time, droplets grow and coalesce inside vessels. Trapped gas bubbles eventually collapse. Time in hours. Bar = 200 μm .

In Vivo Dynamics of Embolism Repair – Supplemental Data

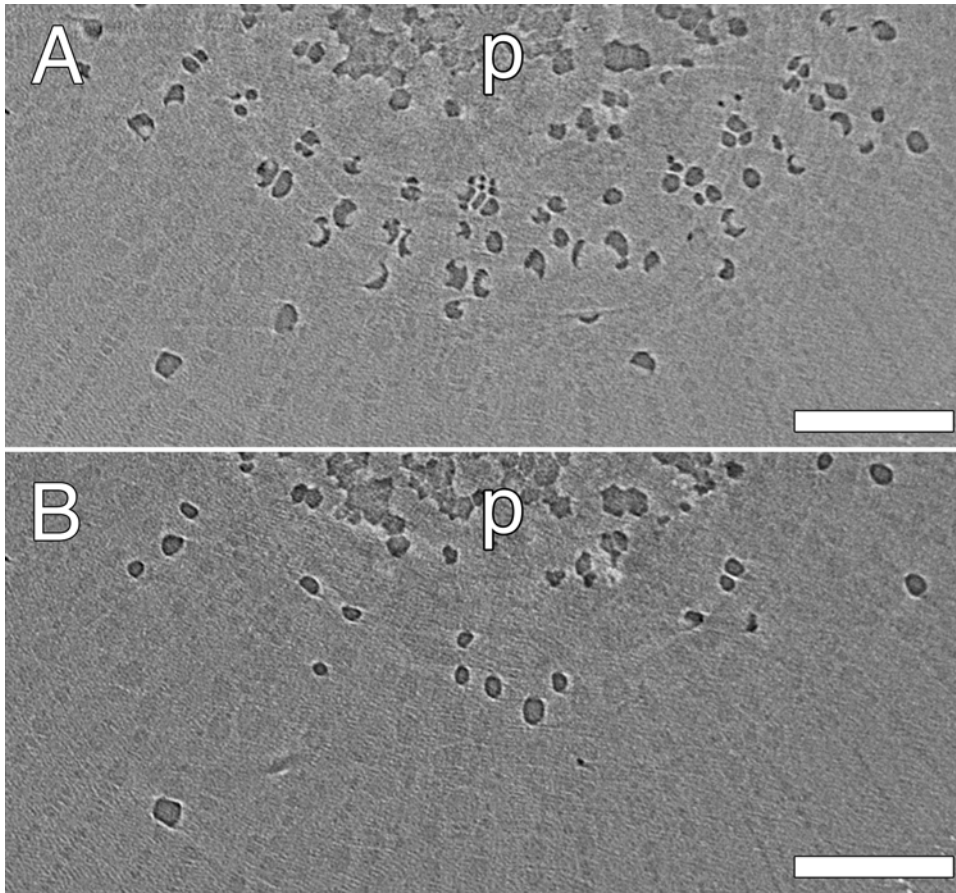


Figure S2. In vivo refilling of grapevine vessels. Transverse HRCT sections early (A) and late (B) in the refilling process. Droplets are visible inside the vessels (A), and refilling is actively occurring in small diameter vessels near the central pith (p). After six hours (B), the majority of the vessels have filled. Bars = 500 μ m.

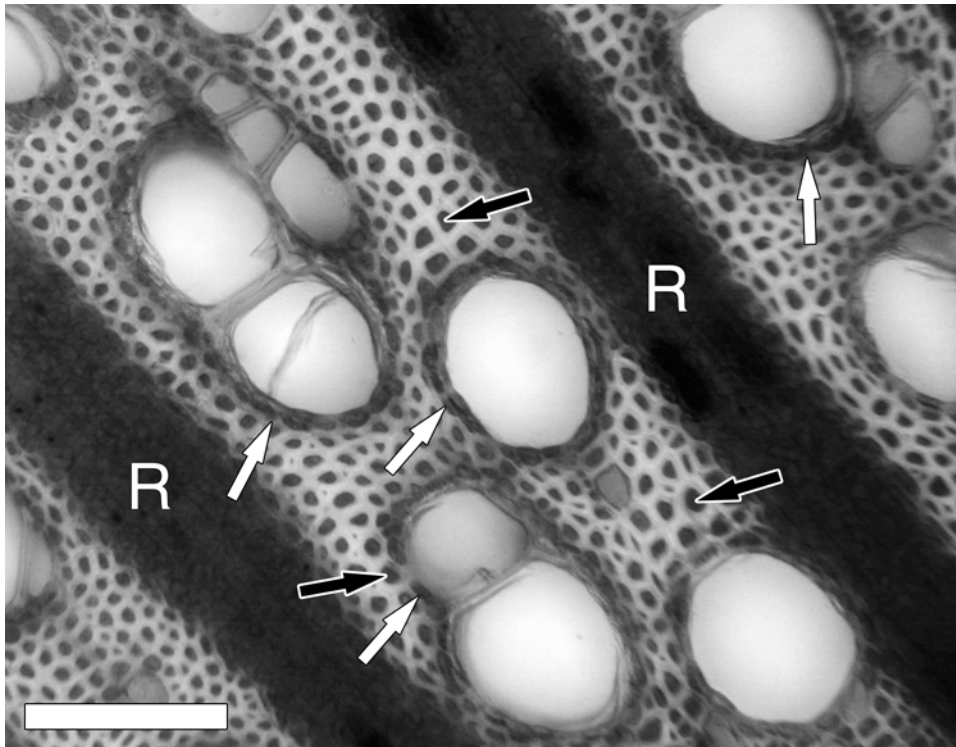


Figure S3. Distribution of cell types surrounding xylem vessels in grapevine. Fibers (black arrows), xylem parenchyma (white arrows), and rays (R) surround the vessels. Bar = 125 μm .

In Vivo Dynamics of Embolism Repair – Supplemental Data

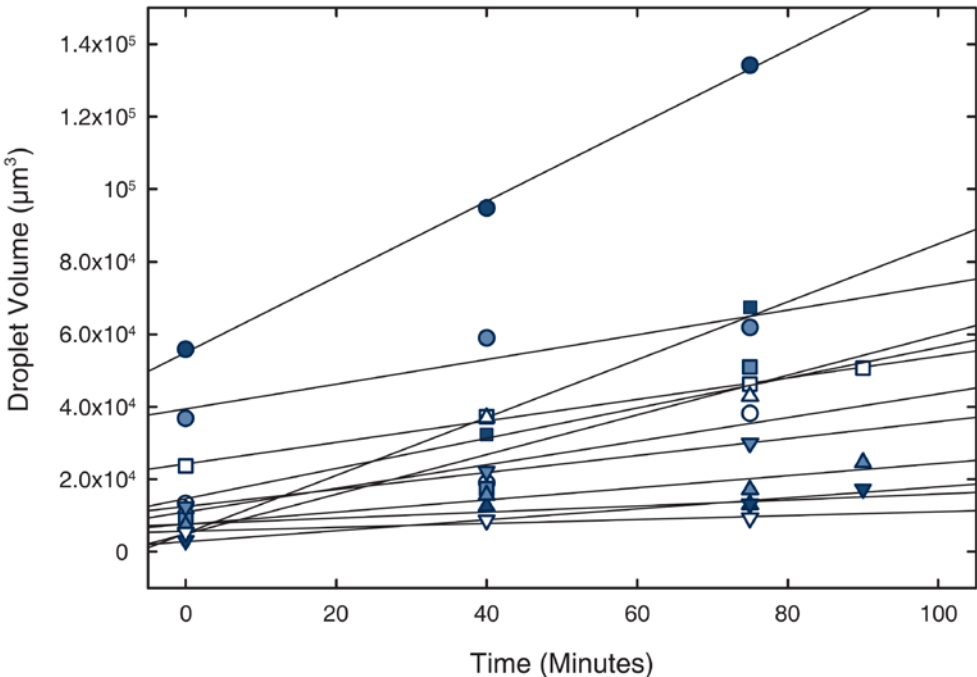


Figure S4. Volume change of 12 individual droplets visualized with time-lapse HRCT scans. Lines are linear regressions for the relation of volume to time ($R^2 = 0.84 - 1.00$, mean = 0.92).

In Vivo Dynamics of Embolism Repair – Supplemental Data

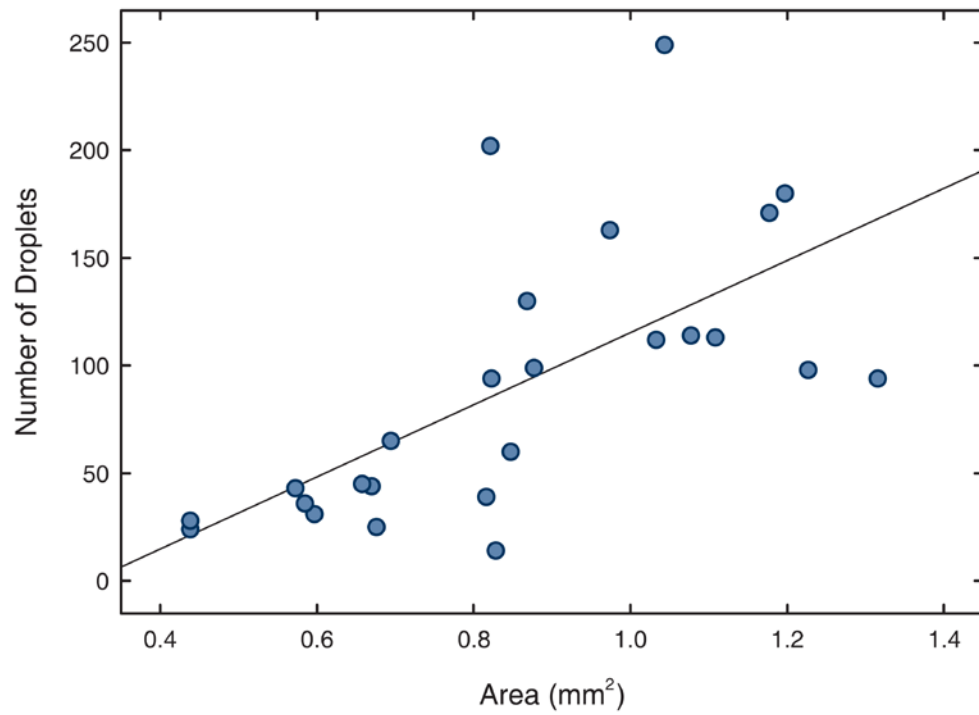


Figure S5. Relationship between the total number of drops in a vessel and the internal surface area. A linear regression is fitted to all data (25 vessels from all three experimental plants). $R^2 = 0.42$.

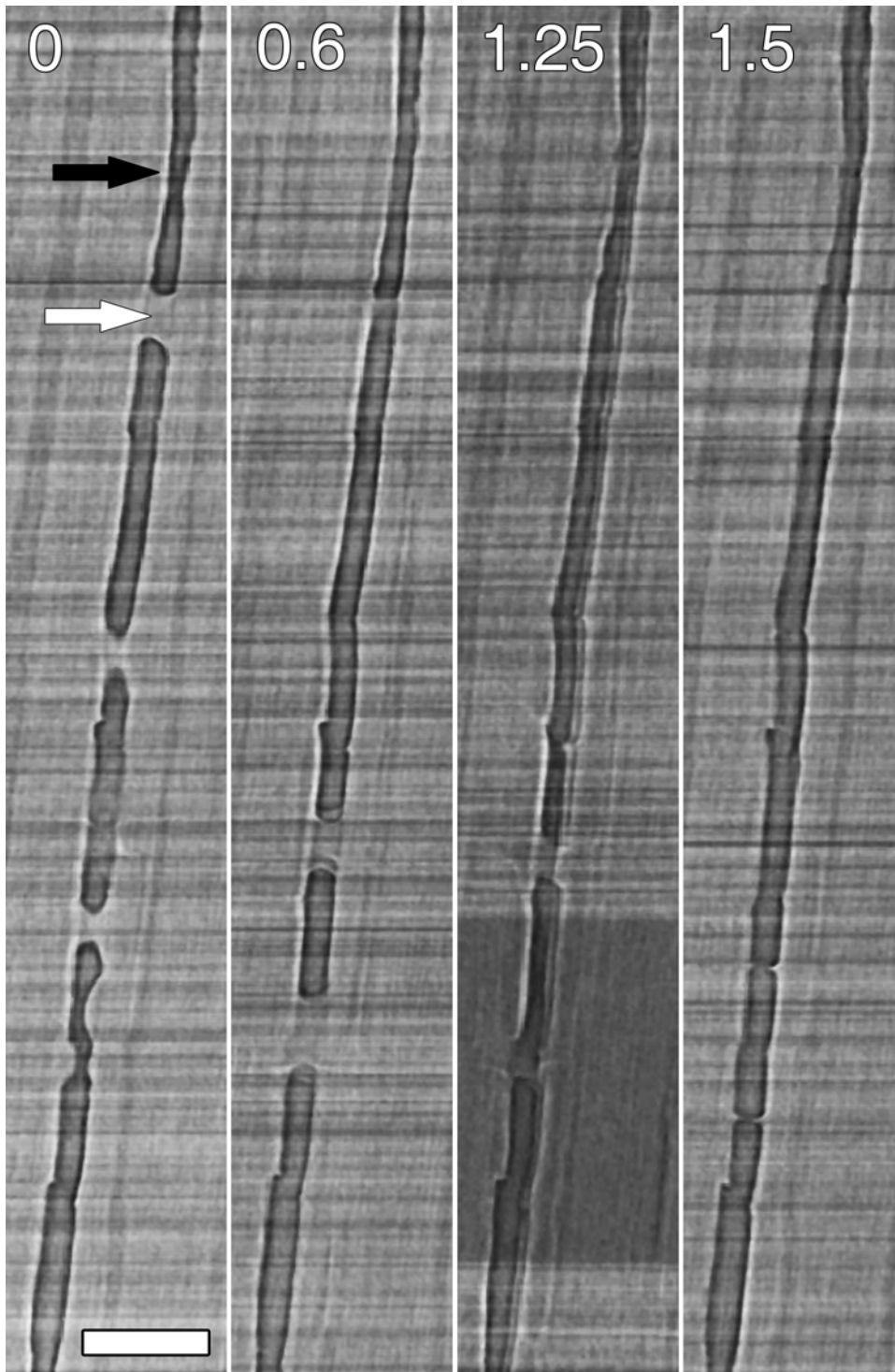


Figure S6. Longitudinal HRCT time series showing refilling failure. Water droplets (white arrow) span the vessel lumen (black arrow) early, but are eventually pulled into a neighbouring filled vessel under tension. Time in hours. Bar = 350 μ m.

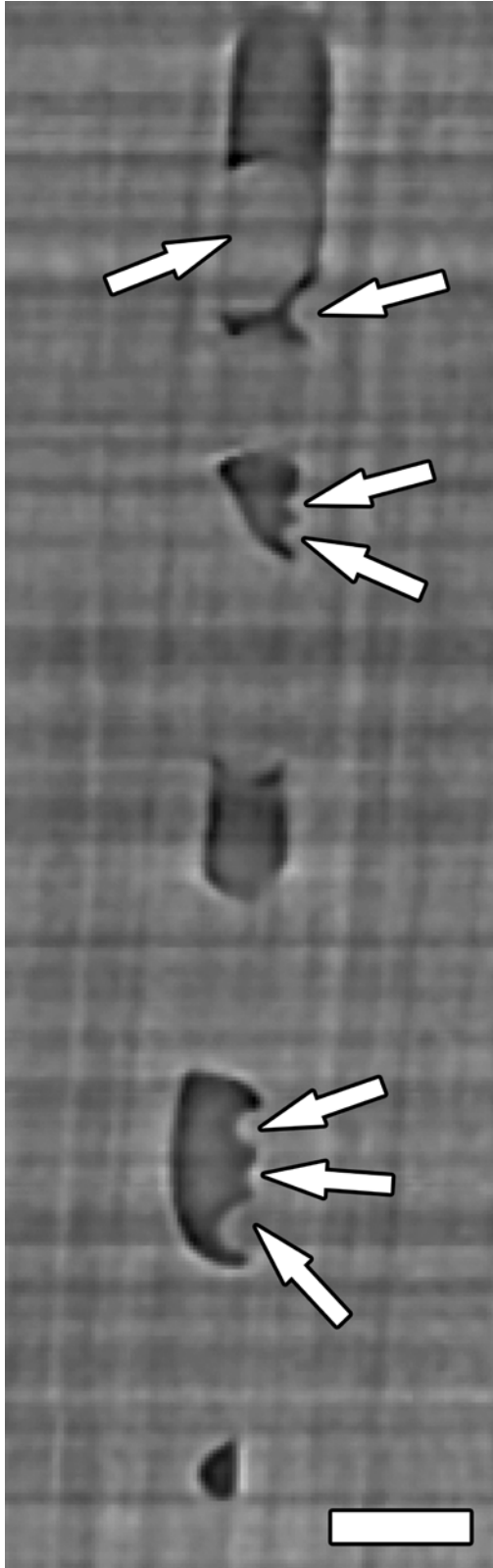


Figure S7. Magnified HRCT scan from Fig. 4A. This image shows droplets (arrows) forming inside of a vessel that eventually fails to refill. Bar = 125 μm .

In Vivo Dynamics of Embolism Repair – Supplemental Data

Table S1. ANOVA data describing the observed and predicted results from droplet growth and refilling analysis.

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	39	93322122602	2392874939	107.29	<.0001
Error	15	334554408	22303627		
Corrected Total	54	93656677010			

	R ²	Coeff Var	Type III SS	Volume Mean
	0.996	13.55	4722.67	34848.53

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Vessel	6	9522721092	1587120182	71.16	<.0001
Drop within vessel	13	7419370784	570720830	25.59	<.0001
Time	1	7591984272	7591984272	340.39	<.0001
Time * Drop within vessel	19	10736616211	565085064	25.34	<.0001

The significance of the Time*Drop within vessel indicates that different drops grow at different rates.

Supplemental Video Legend

Video S1. 3-D reconstruction of refilling vessels in grapevine. Here, a section of stem is displayed by panning through the stack of virtual transverse HRCT sections. Four vessel walls (green) and the droplets within (blue) are revealed. The vessel walls are removed to visualize the droplets. Scale changes with orientation.