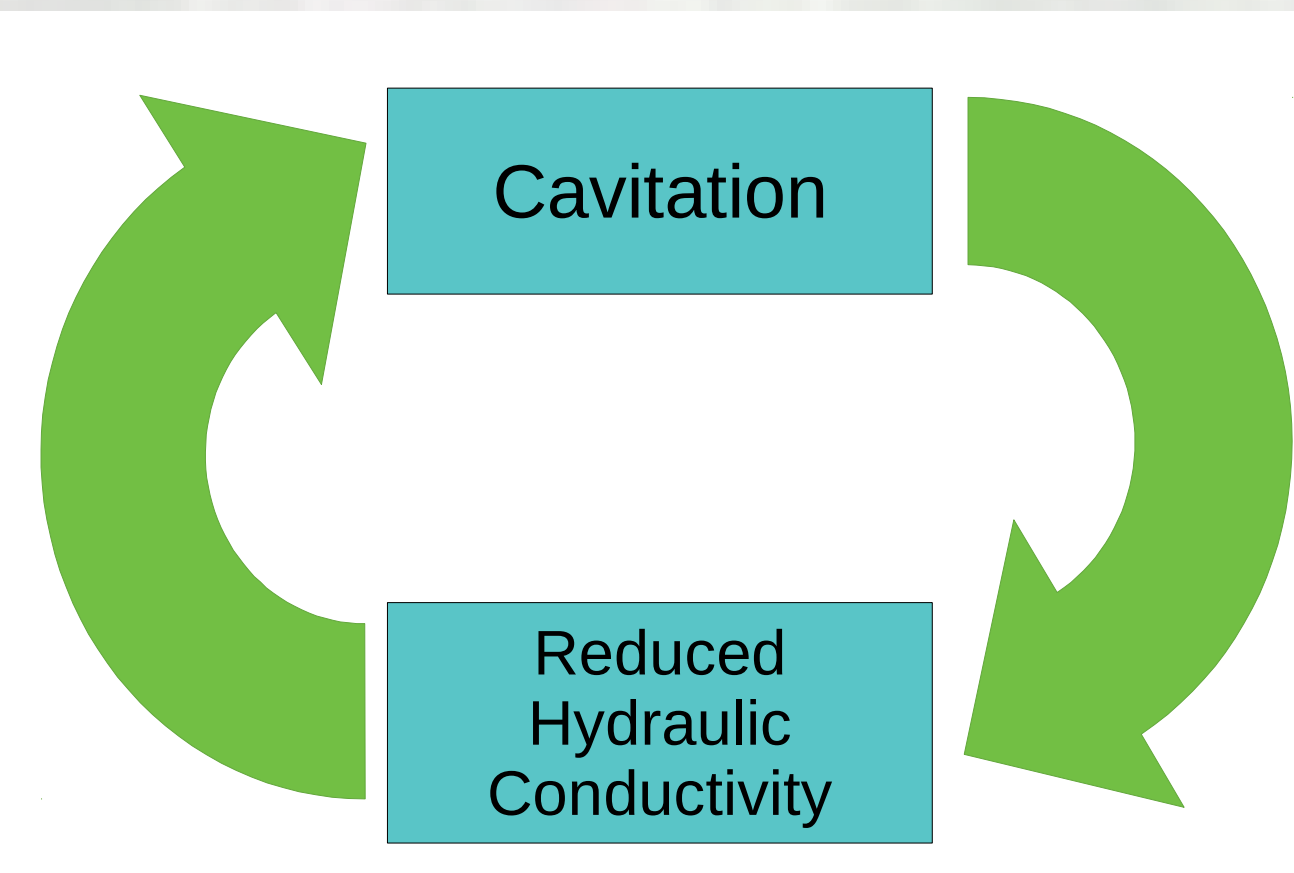


1. MOTIVATION

- Plant hydraulics currently implemented in surface models
- The current understanding is not sufficiently tested

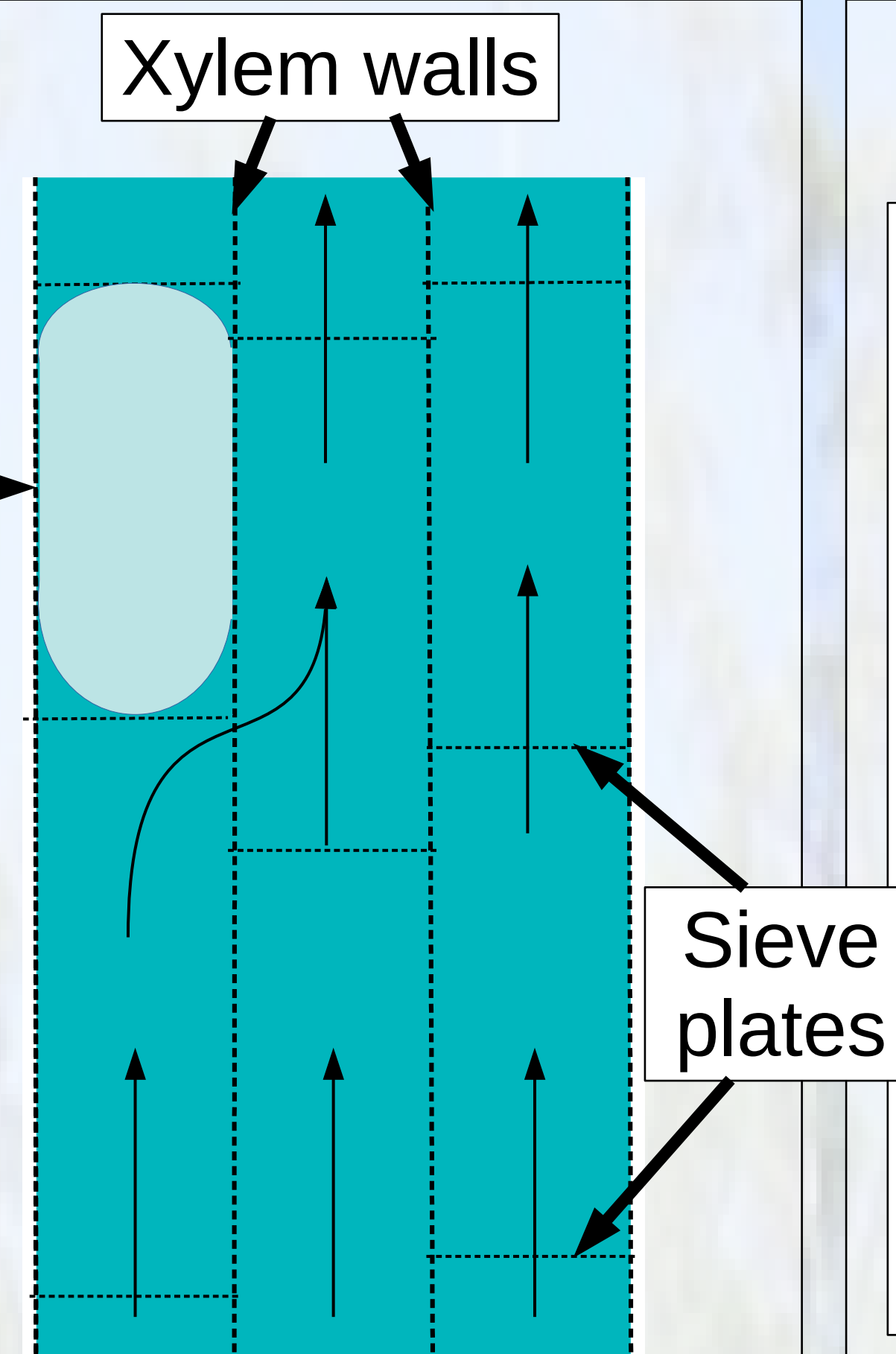
1.1 CURRENT UNDERSTANDING

Runaway cavitation leads to catastrophic hydraulic failure



Air entry due to water under tension

Catastrophic failure prevented by **sieve plates**

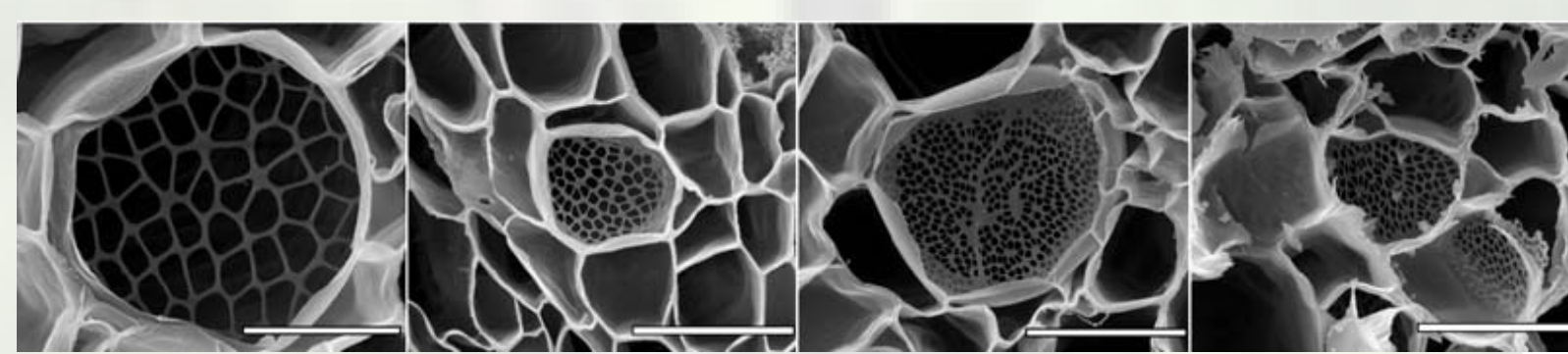


2. OBJECTIVES

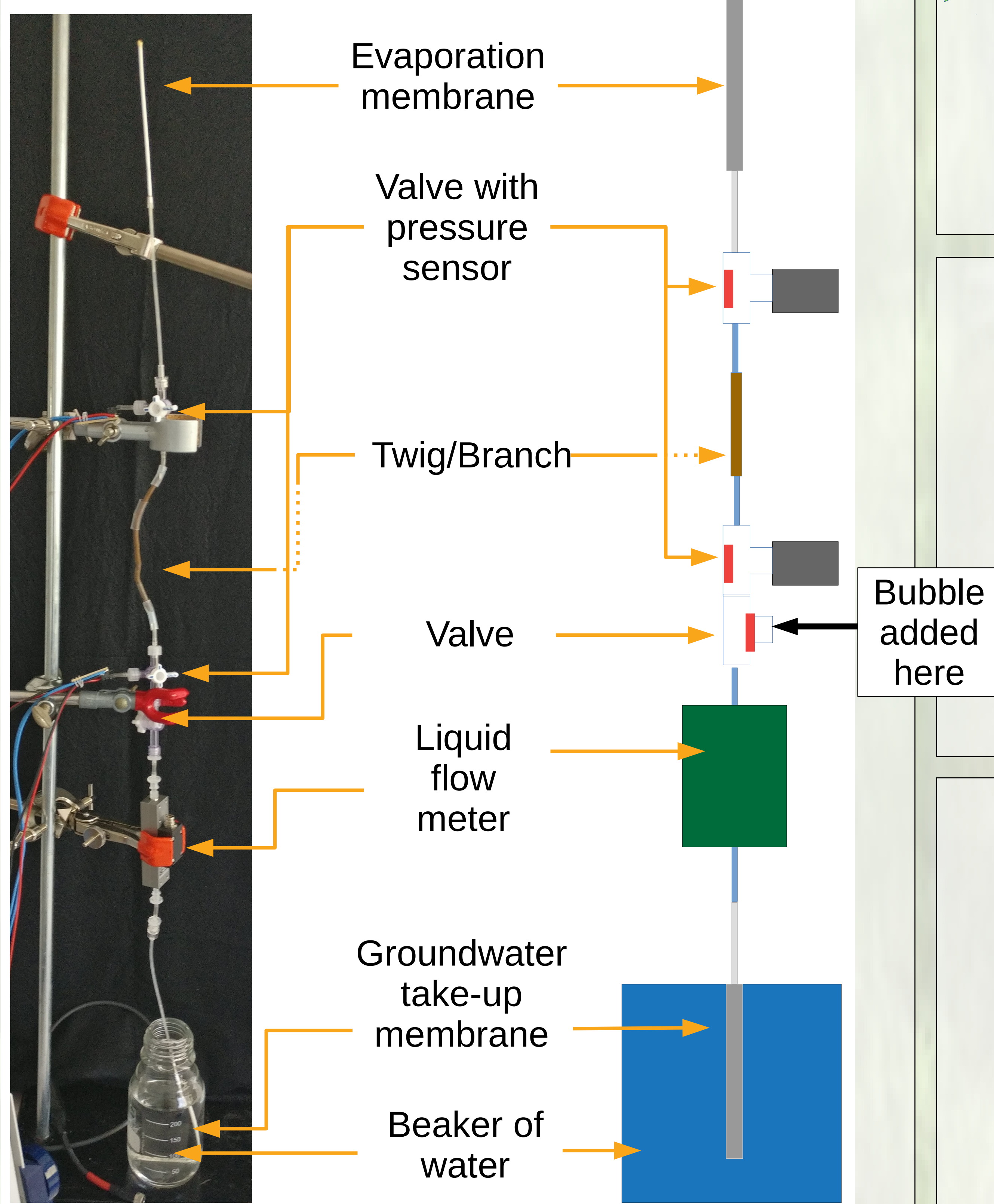
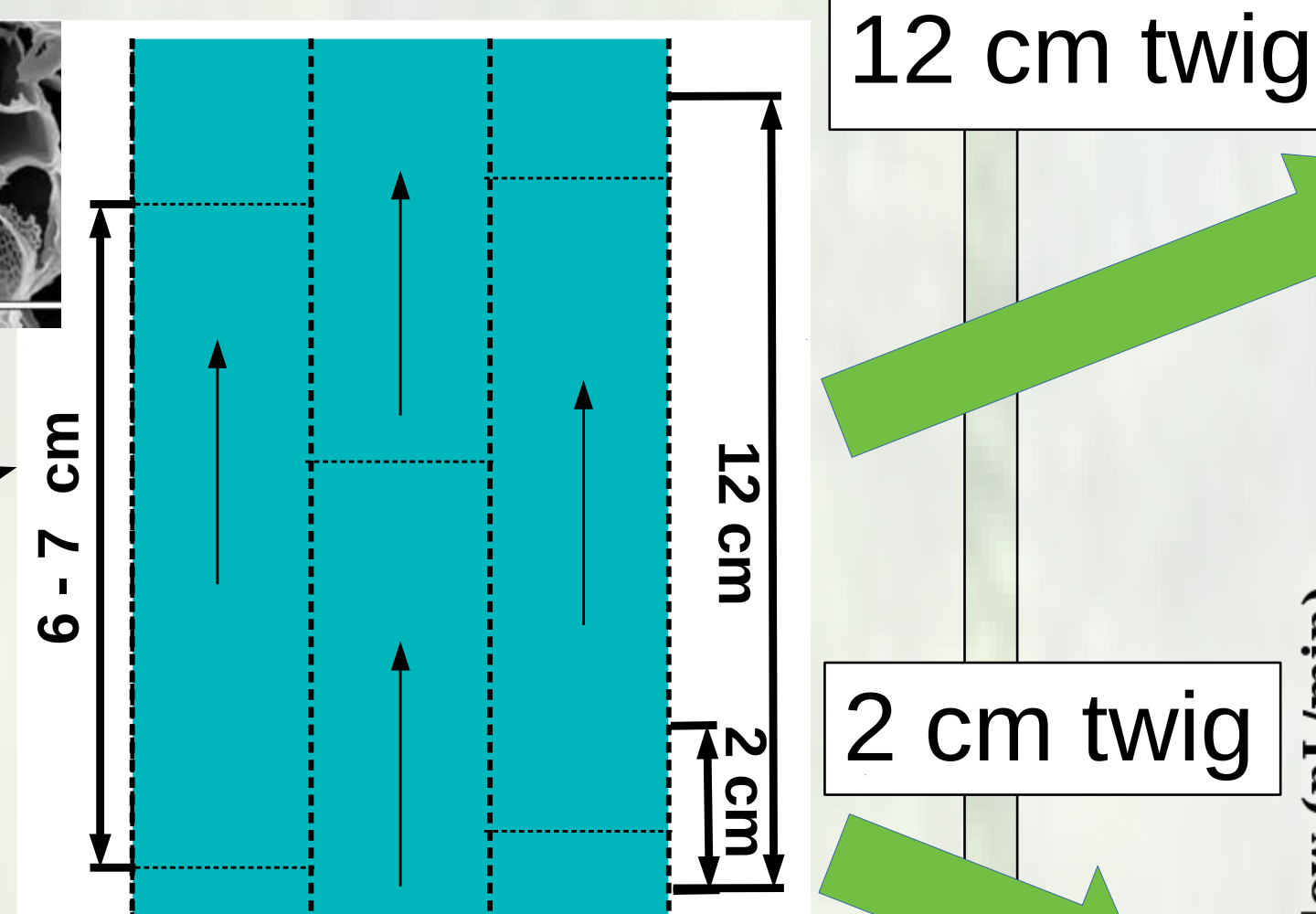
- Test if cavitation inhibits water flow and if sieve plates maintain flow
- Devise a method for measuring hydraulic conductance and failure under controlled but near-natural conditions

3. APPROACH

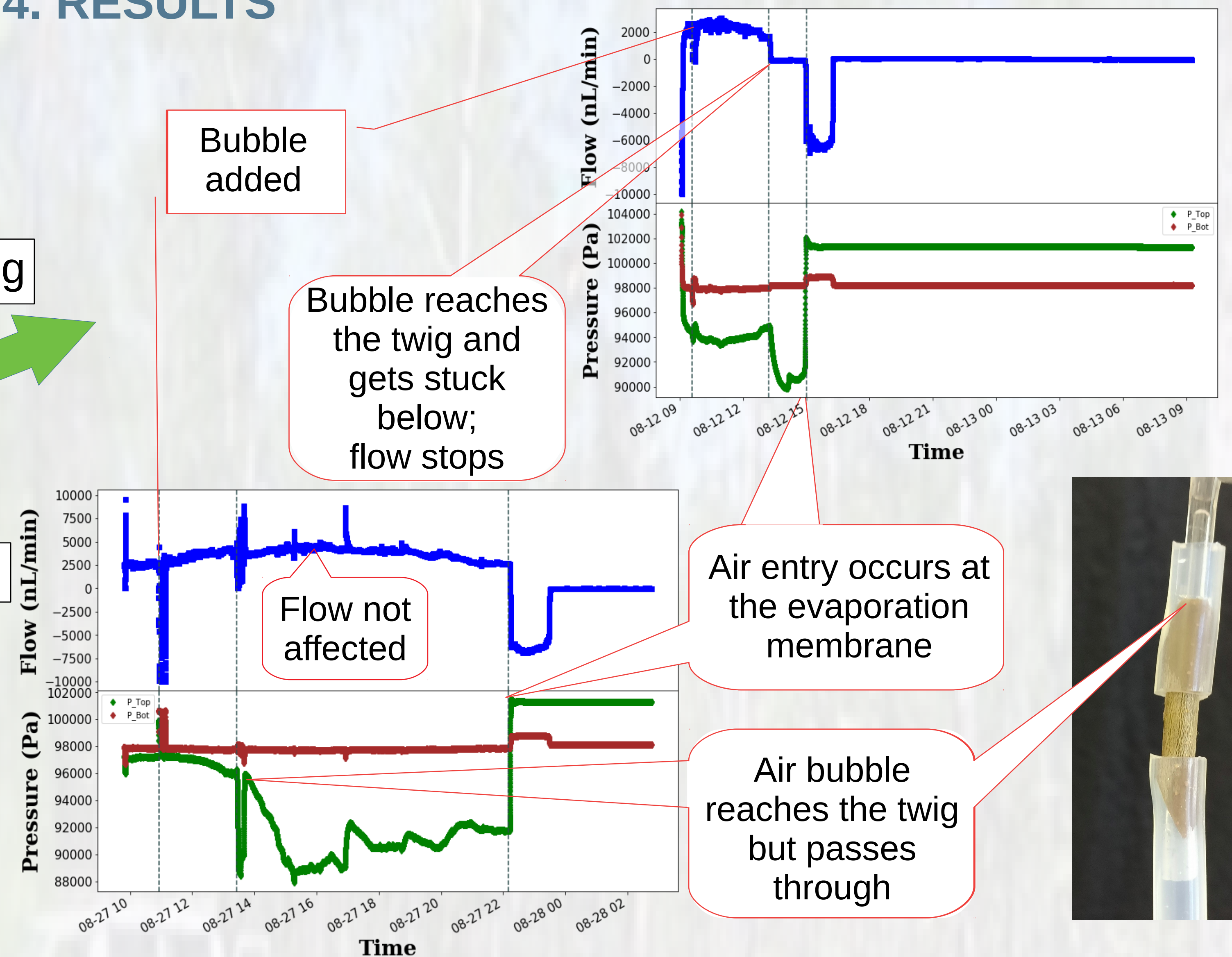
Measure water flow through twig and pressure drop while introducing air bubbles below twig.



Sieve plates are arranged at characteristic distances along the xylem



4. RESULTS



5. CONCLUSIONS

- Cavitation without sieve plates does not inhibit flow
- Sieve plates prevent air from moving up or down even if this prevents flow
- Experimental device enables monitoring rapid responses of flow and hydraulic conductance to forced cavitation

6. NEXT STEPS

- Why do plants construct sieve plates?
- Why do different species have such different sieve plates and distances between them?
- Need to make the system such that I can compare pressure to conductivity at full range of biologically feasible pressures