SI_1

July 28, 2022

1 Membrane experiment with long twig

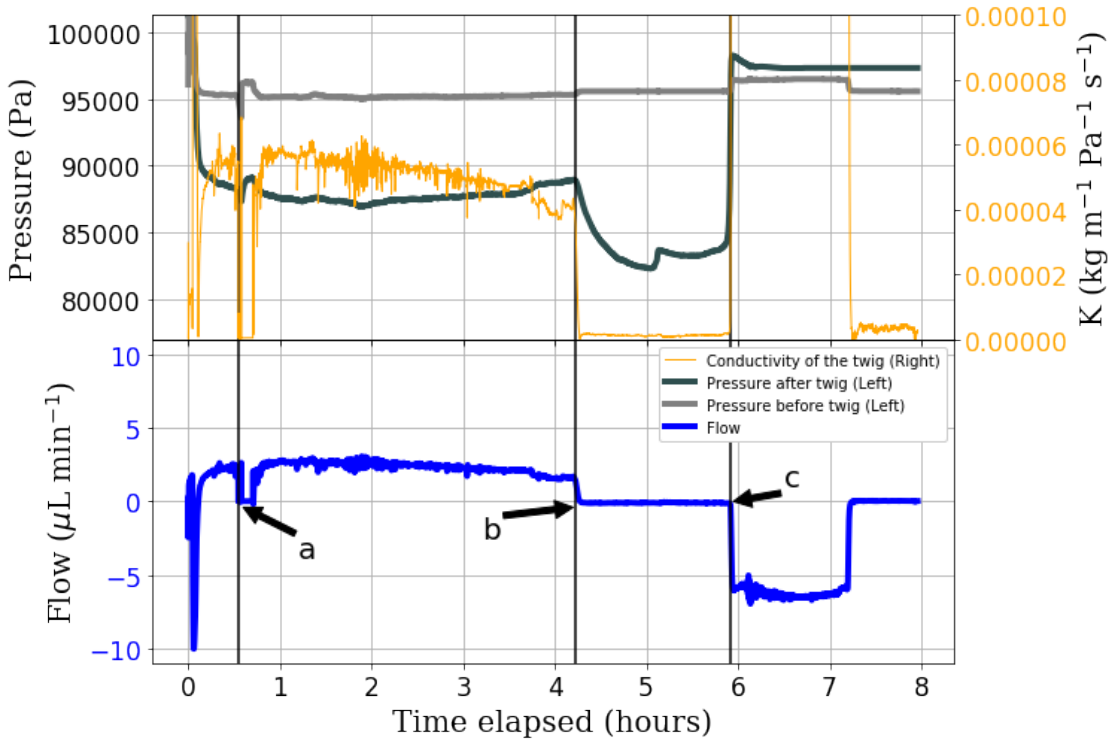

Figure 1 - Flow, pressure, and conductivity measurements of 12.3 cm fagus sylvatica sample in the artificial plant setup. Air bubble was added below the lower pressure sensor 'a', and reached the sample at time 'b' where flow stopped and pressure decreased until air entered the membrane at the top and flow reversed at 'c'.

2 Conductivity using syringe vs measured flow

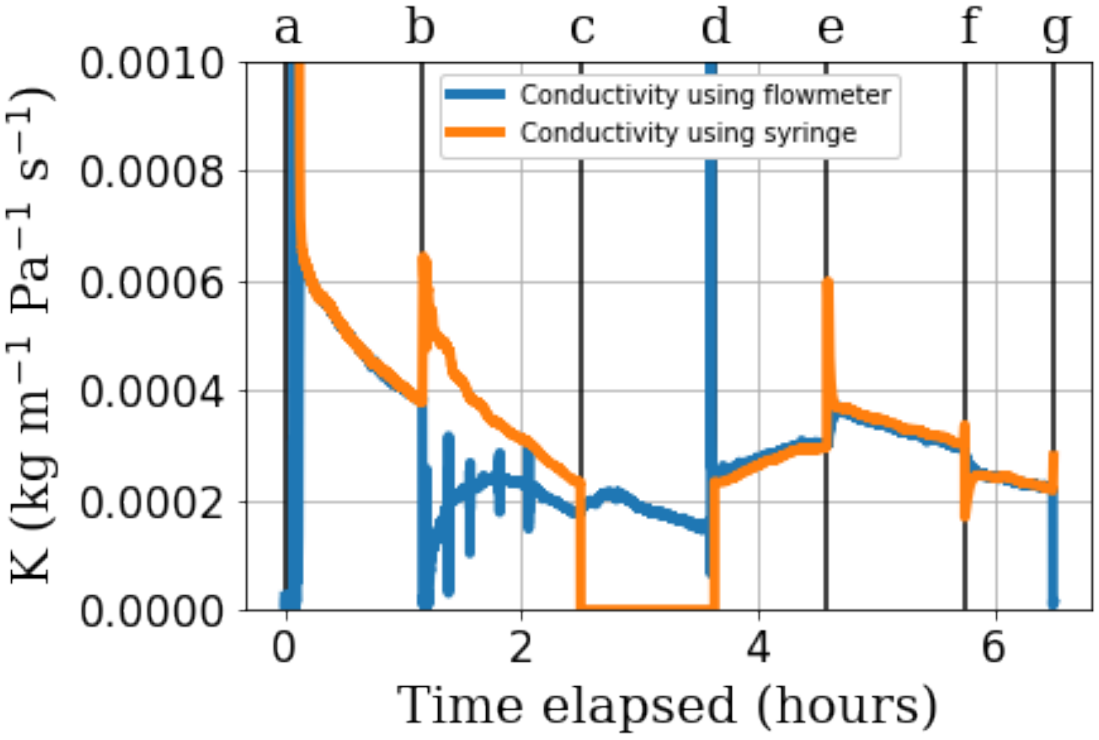

Figure 2 - Time series of hydraulic conductivity calculated using the syringe flow and the measured flow for a 13.5 cm fagus sylvatica twig while simulating different sorts of water stress. At 'a', a constant pull through the twig at 25 μL min^{-1} is applied and flow goes around the capillary. At 'b', flow is lead through a capillary upstream of the twig. At 'c', the syringe pump is stopped. At 'd', conditions are similar to 'a'. At 'e', flow is further increased to 50 μL min^{-1} and returned to 25 μL min^{-1} at 'f'. The experiment ends at 'g'.

3 Capacitance of the system

Here we look at the capcitance of the experimental setup without a twig and only the capillary.

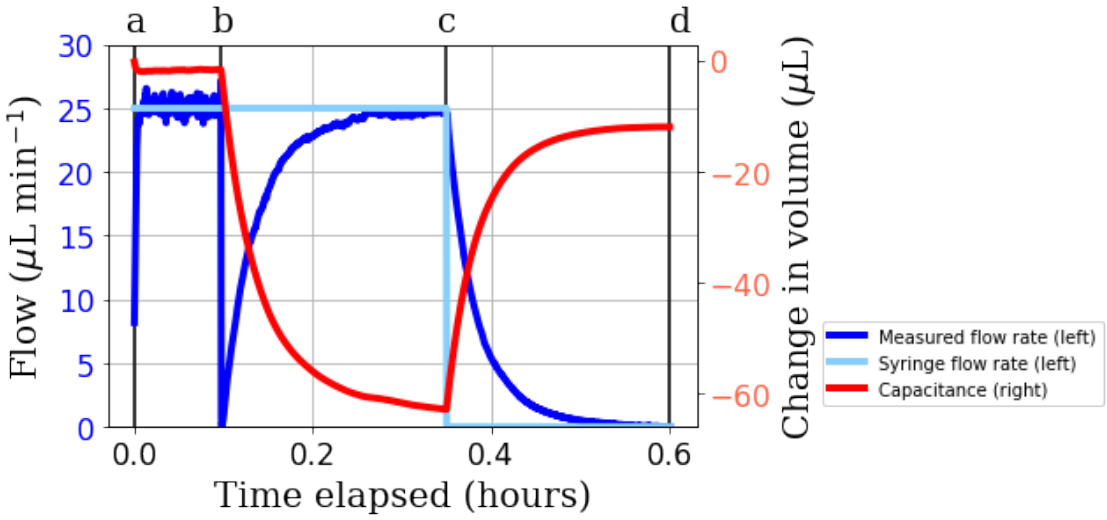

Figure 3 - Flow and capacitance of the horizontal syringe method when stressing the system. At 'a', a constant pull through the twig at 25 μL min^{-1} is applied and flow goes around the capillary. At 'b', flow is lead through a capillary. At 'c', the syringe pump is stopped. The capacitance is the change in volume of the setup due to a difference in flow rates.

4 Comparison capacitance of system vs twig experiment

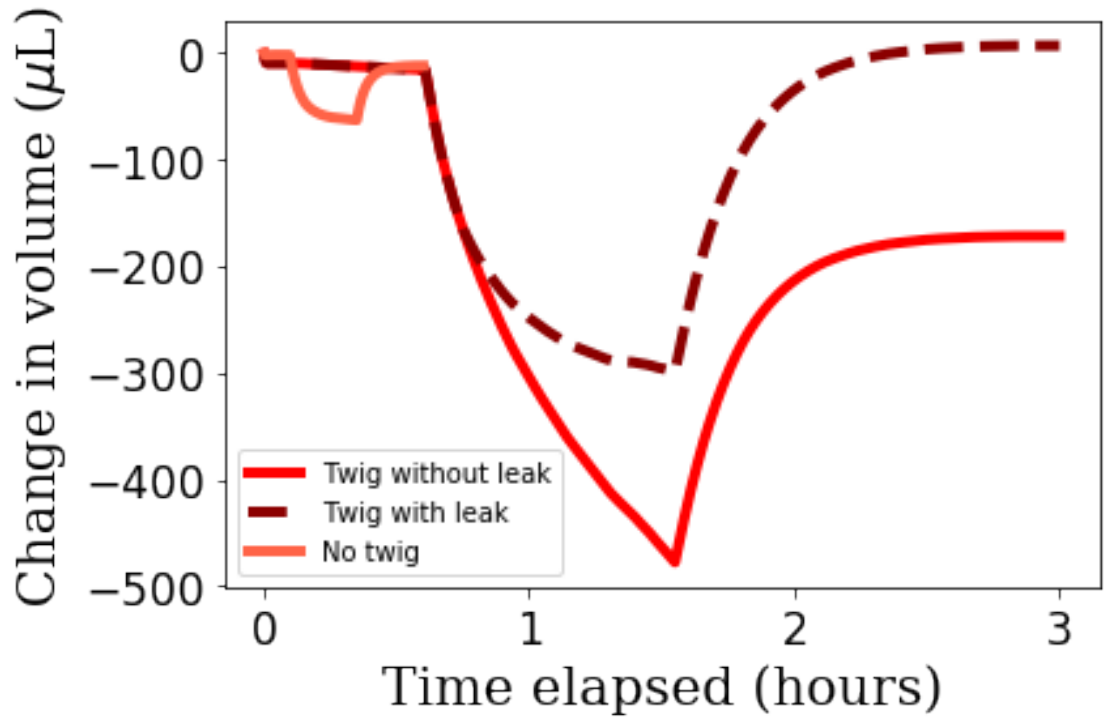

Figure 4 - Change in volume of the system when creating stress condition with and without twig sample. The changes in volume of the twig are represented with and without taking the leak into consideration in the calculations.