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PHLOEM COOLING AS A TOOL FOR INHIBITING XYLEM REFILLING AFTER CAVITATION IN LAUREL

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A robust although circumstantial evidence shows that xylem recovery from cavitation-induced embolism relies on phloem activity. In particular, xylem-associated cells undergo starch depolymerization resulting in sugar transport into air-filled vessels thus drawing water into them. Overall, these cells act as strong sinks to phloem inducing a continuous radial mass flow. The exact role of phloem is, however, matter of debate. The present work represents an attempt at blocking phloem radial unloading without causing wounding as girdling which can *in se* introduce further variables. Phloem was at least partly blocked through cooling stems up to about 6°C. Polypropilene glycol sealing bags were used and stems were maintained at low temperature for 20 min. Both well-watered and water stressed plants were tested for loss of xylem hydraulic conductivity (PLC) using perfusion solutions mimicking native potassium concentrations in xylem sap as measured preliminarly. Other plants were induced to cavitate using a pressure collar applied to 1-year-old stems and then tested for short-term refilling 2 and 20 min after pressure release. Stems of some of these plants were cooled as above for 20 min after pressurization and then tested for PLC as above. To test starch depolymerization of xylem associated-cells and ray cells, the percentage of cells with high starch content was counted under microscope. Our data show that xylem recovery from cavitation really is phloem-dependent in hat stem cooling reduced the drop in PLC without influencing starch depolymerization.