Seasonal and radial variation in sapflow of riparian red alder

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Our objectives were to (1) quantify radial variation in tree water flux and its consequences for scaling to whole tree flux estimates in red alder (*Alnus rubra*), and (2) to determine whether whole tree water flux varies as a function of the distance from a stream over the period of a dry season. Based on earlier work showing relatively uniform vascular anatomy of red alder and radial flow profiles in diffuse porous wood, we hypothesized that there would be little or no reduction in interior sapwood water flux compared to that in outer sapwood. Further, we hypothesized that trees closer to a stream would show higher flux rates which persisted further into the dry season than trees higher up the watershed bank. To meet our objectives, we established a transect consisting of seven, 26-yr-old red alder on a steeply sloped (32%) riparian area at the H. J. Andrews Experimental Forest in the Oregon Cascades. Trees averaged 22.5m in height and 29.4 cm in diameter at breast height and were approximately evenly spaced from streamside to 62 m up the watershed bank. In each tree, two 20 mm long Granier-Type sapflow probes were placed on opposite sides at 0-2 cm depth. Sapflow was monitored continuously at 30 minute intervals from July 1 to Sept 8, 1999. Additionally, to investigate radial profiles in sapflow, four individuals in the mid-section of the transect were equipped with sapflow probes at 2-4 cm and 4-6 cm depths and monitored from Aug. 5 to Aug. 26. Dye staining of sapwood in nearby representative trees was used for an independent estimation of radial flow profiles. Sapflow at the 2-4 cm and 4-6 cm depths averaged 68% and 41%, respectively, of the 0-2 cm depth. Short-term measurements of dye movement showed slightly greater declines with depth but were generally consistent with Granier measurements. There was no evidence for a change in radial trends based on tree size or position in the watershed and there was no relationship between the magnitude of sapflow and slope position throughout the measurement period. Our results did not support either hypothesis, although the radial trends were not as pronounced as those reported for other species. It appears that there was ample soil moisture for all trees regardless of proximity to stream, and that the soil moisture store was sufficiently large to last through the dry season.