

Shoot:root dynamics during growth stages of the rush *Juncus effusus* L.

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Abstract

Growth relationships between above- and belowground portions of *Juncus effusus* L. were examined in cultures that allowed examination of changes in tissue parameters (length, volume, surface area, mass) nondestructively. Mean shoot:root ratios (AFDM \pm SE) decreased 83% (3.68 ± 0.31 to 0.64 ± 0.06) over a 98-day study period. These changes in carbon allocation, even though the aboveground biomass was still increasing, were confirmed with $^{14}\text{CO}_2$ pulse-labelling experiments which indicated a shift toward increased allocation of carbon to roots, particularly during periods of cohort establishment in this species. Root mass (length-specific AFDM, mg cm^{-1}) was poorly correlated with shoot characteristics, but root length was strongly positively correlated with shoot biomass measurements (height; surface area). Analyses of shoot:root biomass relationships indicated decreasing root mass per unit length as shoot biomass increased.

Author Keywords: Root dynamics; Shoot; root growth; Carbon allocation; *Juncus effusus*