

Comparing photophysiology of seagrasses in the Pacific Northwest: potential implications for species interactions

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Physiological tolerances are a primary control on species interactions mediated through production and growth. We examined how the physiology of native eelgrass (*Zostera marina* L.) and introduced Japanese eelgrass (*Z. japonica* Aschers. & Graeb) responded to temperature in order to predict field interactions. Individual shoots of *Z. marina* and *Z. japonica* were collected from local populations in Yaquina Bay, Newport, OR. Photosynthesis (P) and dark respiration (Rd) were measured using oxygen flux methods at 10, 20, and 30 °C. *Z. japonica* P increased with temperature, while *Z. marina* P at 30 °C was significantly lower than *Z. japonica*. At 20 °C both species had similar P rates. Differences observed in photosynthesis at these high water temperatures may be due to heat sensitive oxygen evolving proteins. Rd rates for both species increased with increased temperature. Although Rd was similar at 10 °C, *Z. japonica* Rd was significantly lower than *Z. marina* at both 20 and 30 °C. At 10 °C and 30 °C the differences in P:R between *Z. japonica* and *Z. marina* were not statistically significant. However at 20 °C *Z. marina* had a significantly higher P:R than *Z. japonica*. The ratio of P:R may be related to plant fitness, with higher P:R indicating an advantage with respect to carbohydrate availability. Differences in photosynthetic temperature response between *Z. japonica* and *Z. marina* suggest a mechanism to explain observed zonation patterns and provide insight on how estuarine plant communities may respond to increased water temperatures.