

Establishment Stage Competition between Exotic Crimson Fountain Grass (*Pennisetum setaceum*, C4) and Native Purple Needlegrass (*Stipa pulchra*, C3)

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Crimson fountaingrass, *Pennisetum setaceum*, an exotic perennial C₄ species and a relatively new invader to California, is expanding to areas currently occupied by purple needlegrass, *Stipa pulchra*, a C₃ native. We predicted that fountaingrass seedlings might withstand cool season competition in California's Mediterranean-type climate and establish in *Stipa pulchra* grasslands due to less competition during the warm, dry summer season. A field experiment was conducted to examine competitive interactions of the two species from the cool winter season to the warm summer season. As predicted, *Stipa* produced greater aboveground biomass in the cool season and showed strong intraspecific competition, as well as interspecific suppression of *Pennisetum* growth, whereas *Pennisetum* showed no suppression of *Stipa*. In the warm season, *Stipa* showed relatively less suppression of *Pennisetum*, erasing significant differences, and *Pennisetum* showed increased growth. Results of this study show that C₃ *Stipa* can suppress initial growth of C₄ *Pennisetum*, but in warmer months, *Pennisetum* can overcome this initial suppression. A second study investigated impacts of *Pennisetum* on native California coastal sage scrub, heretofore unknown, designed to investigate which species are present where *Pennisetum* is invading and what impacts *Pennisetum* has on this community. Significant reductions in native species cover were found with increased *P. setaceum* cover in both years in Santa Monica Mountains (SAMO) sites and in 2010 in San Diego sites. Native species richness decreased with increasing *Pennisetum* cover in both years in SAMO sites but not in San Diego sites. Soil samples from high *Pennisetum* cover areas showed higher nitrate, water content and potassium in both regions as compared to low cover areas. These studies indicate that *Pennisetum* may be exploiting an empty niche in California's Mediterranean-type climate, and it may have impacts on native plant communities and soil properties, and thus its control should be prioritized.