

Public Abstract

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Title: Ecological Conditions of Secondary Sexual Dimorphism in *Salix glauca*:
Fundamental and Realized Dimorphic Niche

I used a willow shrub, *Salix glauca*, growing at high altitude in the Colorado Rockies to explore differences in morphology, physiology, and life history between male and female plants. I used this species to explore limits to the range of possible environments that male and female plants might occupy and if these ranges differ because of inherent differences in reproduction. I first consider the assumption that females require more nutrients for seed production than males for pollen production. Results indicate that females require more phosphorus than males. I next explored physiological traits related to water use and showed that male and female plants are physiologically similar over a range of environments, but differences are most evident when water is most limiting. I also considered whether herbivores might restrict and alter the environmental range in which males and females persist. I complimented field observations with experiments and showed that both males and females had similar herbivore intensities, but relationships between plant growth and herbivore were sex-specific. Additionally, chemical defenses were similar between sexes under field and greenhouse conditions whether eaten by herbivores or not. This leads me to suggest that herbivores may not exert great selective pressure and may in part reflect enemies of herbivores decreasing their potential detrimental effects. Overall, ecological conditions are likely a major force controlling male and female ranges.