
****INDIRECT EFFECTS OF NONNATIVE BROME GRASSES ON SMALL MAMMALS IN SAGEBRUSH STEPPE ECOSYSTEMS**

Dan A. Bachen,* Department of Ecology, Montana State University, Bozeman, Montana 59717

Andrea R. Litt, Department of Ecology, Montana State University, Bozeman, Montana 59717

Claire Gower, Montana Fish, Wildlife and Parks, Bozeman, Montana 59718

Megan Higgs, Department of Mathematical Sciences, Montana State University, Bozeman, Montana 59717

Nonnative plants can affect habitat quality for native animals directly, by altering available resources like cover or food, and indirectly, by changing access to these resources and altering species interactions. Understanding these diverse effects is crucial to develop management techniques and maintain ecosystem processes. In sagebrush steppe, brome grasses such as cheatgrass (*Bromus tectorum*) and smooth brome (*Bromus inermis*) can invade and form dense stands, increasing the depth and persistence of litter, as well as the density of standing

vegetation. These structural changes alter abundance and composition of the small mammal community. We used a series of experiments to explore whether changes in vegetation structure associated with the invasion of brome grasses would alter foraging and predation risk for small mammals. In the first experiment, we placed a known amount of grain at stations with increased litter or stem density and measured how much grain was removed overnight. Increased litter impeded foraging; rodents removed 2.8 g (95% CI = 2.09 to 3.05) less grain from these stations. In the second experiment, we timed animals fleeing a simulated predator through various densities of litter or stems and found that dense stems impeded movement more than litter. Based on these experiments, dense monocultures of brome grasses may reduce habitat quality for small mammals by making foraging less efficient and increasing vulnerability to predators. Management techniques for brome grasses should focus on reducing stem density where predation limits small mammal populations and litter where small mammals are food-limited.