

Fire, Herbicide and Disking Effects on Diversifying Crested Wheatgrass Stands in the Northern Great Plains

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Disturbance and seeding techniques were evaluated on grazed and long-term livestock-excluded sites dominated by *Agropyron cristatum* (Agcr) to identify methods diversifying for Agcr with native species. Non-grazed sites were burned, disked, burned then disked, or sprayed with glyphosate then disked. Grazed sites received the same treatments, plus burning and glyphosate, or burning, glyphosate and disking. Fires were in May 2008 under moderate fire conditions when Agcr was actively growing at a 3-leaf stage and about 25 cm tall. Glyphosate was applied mid-June at 0.9 L a.i./ha and disking occurred early August. Subplots were broadcast seeded in November with a mixture of three C₃ grasses, three C₄ grasses, all grasses plus three forbs, or remained unseeded. Fire plus disking initially reduced Agcr density on livestock-excluded plots, but doubled density and increased biomass 72% by the second year. Non-treated plots had similar Agcr density and biomass as those receiving fire or disking alone. Glyphosate plus disking caused a lasting reduction in Agcr density, but did not reduce biomass and produced nearly 10 times the annual grass biomass. All treatments reduced Agcr density in grazed plots compared to fire, with glyphosate plus disking and fire plus glyphosate and disking reducing density 77 and 82% and biomass 71%. Annual grasses produced 982 kg/ha in the most effective treatments for reducing Agcr, whereas they were nearly absent in burned plots. Seeded species established poorly, but did best with fire plus glyphosate and disking. Effective treatments were intensive, indicating further refinement is required for less intrusive techniques.