



Effect of Fire Season and Spring Grazing on Soil Seedbank in the Northern Great Plains

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Fire and grazing are known to affect plant communities, but little is known of their effects on soil seedbank. We tested for these effects using two grazing (non-grazed and 50% mid-June use) and four fire treatments (non-burned, summer, fall, and spring) with four replicates. Ten soil cores (10.16-cm diameter) were collected to 3 cm depth in September 2007, spread in flats and seedlings were grown in a greenhouse. Thirty-nine species emerged from soil samples and 8, representing 79% of the average total seedlings (7287 m⁻²), were affected by fire or grazing. The most abundant of these, *Bromus japonicas* (37.6%), was reduced 30% by fall or spring fire and 45% by grazing. *Logfia arvensis* (27.0%) was reduced 90% by fire in any season. Fire in any season reduced total annual forbs to 24% of the non-burned sites. Spring fire reduced native forbs 63% in non-grazed sites with no effect in grazed sites. Native forb seedlings from grazed sites were more abundant in fall-burned (2186 ± 383 m⁻²) than non-burned, summer, or spring-burned sites (991 m⁻²). Fire in any season reduced introduced forb species from 6242 ± 2147 to 757 m⁻². Perennial grasses and forbs were not affected. Grazing effects were primarily limited to *Bromus japonicas* as timing was set to coincide with inflorescence emergence from the sheath. Although fire in any season reduced introduced forbs, fall fire may be preferable for restoration because summer fire did not reduce *Bromus japonicas* and spring fire reduced native forbs on non-grazed sites.

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