
Restoring Forbs for Sage Grouse Habitat: Fire, Microsites, and Establishment Methods

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Abstract

The decline and range reduction of sage grouse populations are primarily due to permanent loss and degradation of sagebrush-grassland habitat. Several studies have shown that sage grouse productivity may be limited by the availability of certain preferred highly nutritious forb species that have also declined within sagebrush ecosystems of the Intermountain West, U.S.A. The purpose of this study was to determine the suitability of three species of forbs for revegetation projects where improving sage grouse habitat is a goal. Species suitability was determined by evaluating the emergence, survival, and reproduction of *Crepis modocensis*, *C. occidentalis*, and *Astragalus purshii* in response to method of establishment (seeding or transplanting), site preparation treatment (burned or unburned), and microsite (mound or interspace) in an *Artemisia tridentata* ssp. *wyomingensis* vegetation association in south central Oregon. For seeded plants *A. purshii* had the lowest emergence (8%) of all three species. Both seeded *Crepis* species had similar overall emergence (38%). Significantly more *Crepis* seedlings emerged from

shrub mounds in unburned areas (50%) than in any other fire-by-microsite treatment (33 to 36%). Approximately 10% more *Crepis* seedlings survived in mounds compared with interspaces. Nearly twice as many emerging *Crepis* seedlings survived in the burned areas as opposed to unburned areas ($p < 0.01$). This resulted in more plant establishment in burned mounds despite higher emergence in unburned mounds. *Astragalus purshii* seedlings also survived better in burned areas ($p = 0.06$) but had no differential response to microsite. Fire enhanced survival of both *Crepis* and *A. purshii* transplants ($p = 0.08$ and $p = 0.001$). We believe additional research is needed to improve *A. purshii* emergence before it will become an effective plant for restoring sage grouse habitat. Conversely, we conclude that these *Crepis* species provide a viable revegetation option for improving sage grouse habitat in south central Oregon.

Key words: *Astragalus purshii*, *Centrocercus urophasianus*, *Crepis modocensis*, *Crepis occidentalis*, fire, forbs, prescribed burning, revegetation, sagebrush steppe, sage grouse.