Grazing *Nassella*

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Grazing *Nassella*

Maintaining Purple Needlegrass in a Sea of Aggressive Annuals

By Melvin R. George, Stephanie Larson-Praplan, Morgan Doran, and Kenneth W. Tate

On the Ground

- Purple needlegrass responds positively to early spring grazing that reduces competition from invasive annuals.
- Rest during flowering allows for seed set and regrowth before soil moisture is depleted.
- Dry season grazing can create a harsh soil surface microclimate during germination and seedling establishment of competing annuals the following year.
- Purple needlegrass is not preferred by grazing livestock during the dry season, but high stock densities can increase its utilization.

Keywords: native grass, purple needlegrass, defoliation, clipping, tillering, regrowth.

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Maintaining purple needlegrass populations requires informed grazing management but defoliation or grazing effects on native perennial grasses in California's annual-dominated rangelands have received little attention because they were not the dominant or key species for management. These native perennial grasses begin vegetative growth in the fall after the first rains, grow slowly during the winter, and then grow rapidly with warming spring temperatures. Vegetative growth peaks and flowering begins by April, but some vegetative growth can continue into June.[1,2] Surrounding annual vegetation begins flowering by early April and reaches its peak standing crop as soil moisture is depleted, commonly in late April or May.[1–3]

As demand for native grass restoration in California's grazed annual rangelands increases, rangeland managers and restoration ecologists have become interested in how growth of native grasses, especially purple needlegrass (*Nassella pulchra* [synonym *Stipa pulchra*]) is affected by defoliation. Although intense continuous grazing is one of the disturbances that contributes to the loss of native perennial grasses and their replacement by nonnative annual grasses and forbs, little is known about the growth response of these native grasses to intensity, season, frequency, and duration of defoliation.[4]

Our objective in this article is to compile grazing guidelines for purple needlegrass, supported by scientific literature and manager experience, and to report on a 2-year clipping study of the effect of defoliation frequency and intensity on purple needlegrass regrowth during the rapid spring growth period.

Grazing Exclusion

Responses of native grasses to grazing exclusion have been inconsistent. In one study, Pacific hairgrass (*Deschampsia holciformis*) increased in response to protection from grazing but California oatgrass (*Danthonia californica)* decreased.[5,6] In another study, California oatgrass increased with grazing removal.[7] Researchers have observed that moderate or even heavy grazing stimulated vegetative growth in California oatgrass and reduced competing annuals.[8]

Studies have shown that purple needlegrass can increase, decrease, or remain stable when protected from grazing.[9,10] A purple needlegrass stand growing on fertile soils near Berkeley, California decreased after several years of protection.[11] In another study, the weight and basal area of purple needlegrass in grazed and ungrazed stands were not significantly different; however, clumps of needlegrass were smaller and more numerous in grazed stands than in ungrazed stands.[12] Coastal studies in San Mateo County, just south of San Francisco, California, found that purple needlegrass decreased on grazed upper slopes but increased on grazed middle and lower slopes.[6] In exclosures at the University of California Hopland Research and Extension Center (near Hopland, California) density of purple needlegrass decreased over a 21-year period and then increased to its original density after 41 years. In another exclosure, purple needlegrass remained stable over the 41-year period.[13,14] In a comparison of fire and grazing effects on purple needlegrass at the Jepson Prairie south of Dixon, California, basal area increased significantly in unburned plots that were spring-grazed or summer-grazed compared to ungrazed purple needlegrass. Although not significant, needlegrass density decreased less with spring grazing than with summer grazing or no grazing.[15]