

## EFFECT OF FIRE ON HERBACEOUS YIELD OF SAGEBRUSH-BUNCHGRASS RANGE

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When early settlers made their way west, some encountered vast grassland areas. These areas undoubtedly were a result of wildfires which reduced the sagebrush canopy cover, thus releasing the grasses and forbs. Fire control and, to a smaller degree, grazing have resulted in a monoculture of sagebrush on these ranges during the last 100 years.

Adequate information is available on general fire effects for most species. However, there is virtually no information available on the effects of fire on the total herbaceous production of plant communities. This study was conducted to evaluate the effects of prescribed fire on yield of a sagebrush-bunchgrass community and contrast these results to an adjacent grazed area in good condition.

### METHODS AND PROCEDURES

This study was conducted at the Squaw Butte Range Unit of the Eastern Oregon Agricultural Research Center. Two adjacent areas were treated during October 1979. One area was grazed during the first two weeks of October; an adjacent area was burned during the third week of October. Approximate utilization on the grazed area was 75 percent.

Herbaceous vegetation on the areas was dominated by bluebunch wheatgrass, Thurber needlegrass, Idaho fescue, junegrass, squirreltail, lupine, and astragalus. Sagebrush was primarily basin big sagebrush and Wyoming big sagebrush. Herbaceous vegetation was sampled one growing season after treatment in September 1980. Yield estimates were obtained by clipping 20, 9.6 square foot quadrats per area. Clipped vegetation was separated into grasses and forbs, oven dried then weighed.

Conditions at the time of burning were; (1) wind speed at 6 miles per hour, (2) air temperature at 75 degrees Fahrenheit, and (3) relative humidity at 20 percent. Surface soil moisture was low at about 4 percent. Fuel moisture of leaves and small stems of the sagebrush was 49 percent. Under these conditions, only those areas with a sagebrush canopy cover of more than 20 percent burned unless the fine fuel was above 800 pounds per acre.

### RESULTS AND DISCUSSION

The long held opinion that fire severely damages herbaceous vegetation was not supported by this research (Figure 1). Comparing late season grazing to burning, showed that the grazed area produced 490 pounds per acre and the burned area produced 696 pounds per acre. Although these values are not statistically different, they certainly illustrate that the first year response from burning can be positively compared to grazing.

YIELD OF HERBACEOUS VEGETATION  
OF BURNED-GRASSLANDS

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When early mowing was used, some experimental yield was obtained. These areas are usually a result of mowing in the early stages of regrowth. This mowing was done in the spring and summer, and in a similar manner, mowing has resulted in a reduction of yield. On these lands, the yield was low, and the yield was low.

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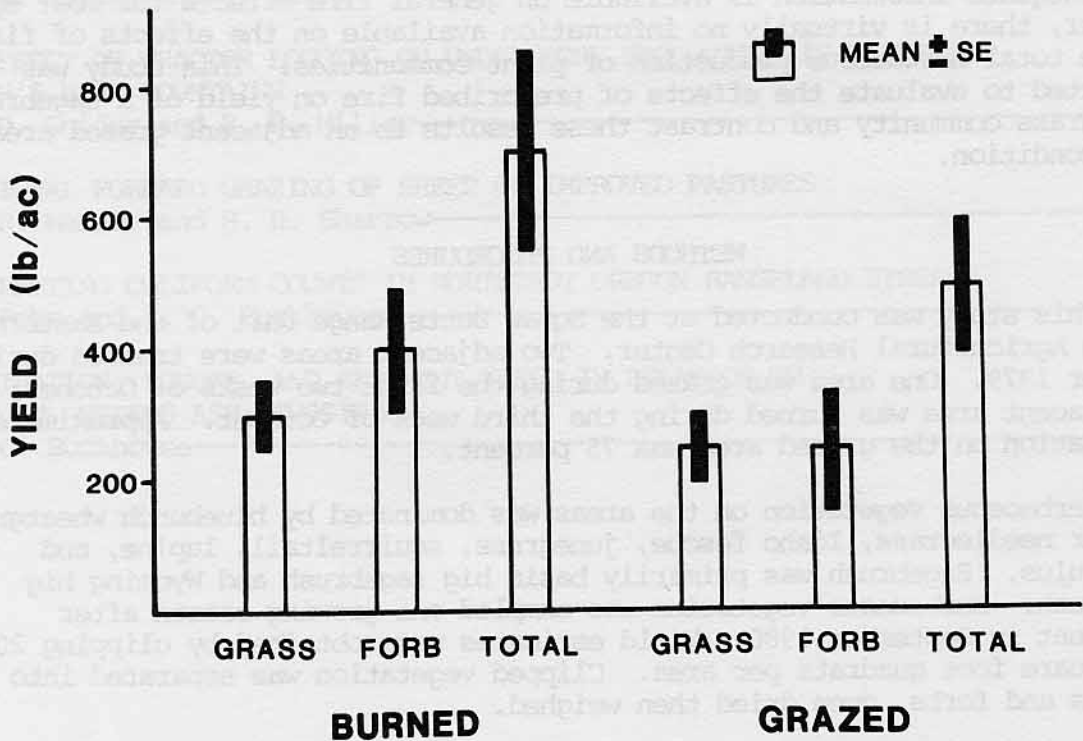


Figure 1. Yield of herbaceous vegetation for areas that were burned or grazed during October in eastern Oregon.

The total yield of the burned areas was significantly higher than the yield of the grazed areas. This was due to the fact that the burned areas had a higher yield of herbaceous vegetation. The yield of the burned areas was significantly higher than the yield of the grazed areas. This was due to the fact that the burned areas had a higher yield of herbaceous vegetation.

Yield of grasses on the burned area was 297 pounds per acre as contrasted to 244 pounds per acre for grazed area. Forb yields were 399 and 246 pounds per acre for burned and grazed areas, respectively. Therefore, the primary difference in the two treatments resulted from differential yield of forbs. Forbs that contributed most to this difference were lupine, astragalus, and ground smoke. Ground smoke was present conspicuously on the burned area although virtually absent on the grazed area.

The difference in yield of the two areas possibly can be attributed to mortality of the sagebrush on the burned plot. Grasses on the burned area stayed green about 2 weeks longer than those on the grazed area indicating a greater supply of available soil moisture. This release from competition undoubtedly benefited the herbaceous plants and this effect will continue in the future. The probable course of change in the ratio of grasses to forbs will be an increase in the yield of the grasses. Squirreltail will be the first species to reach optimum levels of production. Thurber needlegrass probably will be the last species to reach its optimum yield.

Results of the study indicated that burning sagebrush-bunchgrass range in October produced similar vegetational responses compared to those of grazing during the same period. Damage to perennial grasses, long attributed to burning, was not apparent.

#### EFFECTS OF EARLY SPRING GRAZING ON YAMHILL WHEAT YIELD

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Livestock grazing of small grains during the early portion of their growing cycle is practiced to some degree wherever grain is grown. Winter through early spring grazing of winter wheat is a common practice throughout the Great Plains Region of the United States. While extensive work has been conducted to document the agronomic, economic, and animal production implications of wheat grazing in the Midwest, much less Pacific Northwest information is available.

A topic of obvious interest to wheat producers is the impact of livestock grazing on wheat yields. If you search the world literature on this subject, you will find numerous accounts of decreased grain yields under grazing, some observations that grazing had no effect on grain yields, and a few reports of increased grain yields on grazed fields. Reductions of yield as a result of grazing generally result from fewer wheat heads produced per acre. Increased yields largely are attributed to greater stooling (tillering) of grazed plants, and, therefore, more heads produced per acre or to increased resistance to lodging of potentially tall wheat plants whose height has been stunted by grazing. One unifying principle which is commonly agreed upon by all investigators is that if grazing is continued too long into the spring, animals remove the immature wheat heads and substantial reduction in grain yields can be expected. In fact, many reports of reduced grain yields under grazing probably result from grazing too late in the plant's growth cycle.