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

S. H. Sharrow

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.

A study was conducted during 1979 and 1980 to evaluate the effects of spring grazing by sheep on the grain yield of Yamhill winter wheat. Three wheat fields near Corvallis, Oregon, were used in this study. The entire fields, with the exception of approximately one-fourth acre exclosures (for ungrazed plots in each field), were intensively grazed by sheep in mid-March both years. Adequate numbers of ewes were put into each field to graze the wheat down to a stubble height of approximately 1 1/2 inches within a 5- to 7-day grazing period. Components of yield were measured by hand-harvesting the wheat in approximately 11 yards of row from grazed and ungrazed plots in each field. All wheat harvested was sorted into straw, chaff, and grain. Plants/yard of row and tillers/plant at harvest were counted. Individual wheat heads were examined to determine spikelets/head, grains/spikelet, and seed weight.

The impacts of sheep grazing on wheat yield is summarized in Table 1. Spring grazing had no real effects on straw or chaff yield. Grain yield, however, was approximately 10 percent higher in 1979 and 27 percent higher in 1980 on grazed than on ungrazed plots. The rather large difference between grazed and ungrazed plots in 1980 probably includes some normal measurement errors. It is reasonable to expect that the actual yield increase as a result of grazing is nearer to the 10 percent observed in 1979 than to the 27 percent observed in 1980.

Table 1. Components of Yamhill Wheat Yield from Grazed (G) and Ungrazed (C) Plots

Component	1979		1980	
	G	C	G	C
Grain Yield (lbs/yard)	0.18	* 0.17	0.17	* 0.13
heads/yard	46	48	43	45
plants/yard	18	19	21	21
heads/plant	2.7	2.6	2.0	2.2
Seeds/head	43	* 39	41	* 21
seeds/spikelet	--	--	2.2	2.3
spikelets/head	--	--	19.2	* 17.3
Seed Weight (mg)	42	40	42	* 39
Straw Yield (lbs/yard)	0.15	0.14	0.17	0.14
Chaff Yield (lbs/yard)	0.04	0.03	0.04	0.03

Means with a star between them differ P .05.

In contrast to other studies, our results indicate that increased grain yields do not reflect changes in the number of heads produced per acre. We observed no differences in heads/plant, plants/yard, or heads/yard of row on grazed compared to ungrazed plots. We must conclude, therefore, that grazing did not promote increased tillering of wheat plants, as previously believed. In our case, increased grain yields resulted from more seeds produced per head of wheat. This appears to be caued by more clusters of flowers (spikelets) being produced per head on grazed plots rather than from more seeds per cluster (seeds/spikelet). The exact mechanism which produces this effect is unclear. Further investigation in this area obviously is needed to gain a clearer understanding of how early grazing effects subsequent ear development of winter wheat.

Experience gained in this study, together with reports from scientists working in other geographic areas, indicate that wheat may be grazed by livestock without reducing grain yields if grazing is terminated before the plant begins to elevate the immature wheat head (before jointing) and if an adequate length of growing season remains for the plant to recover after grazing. These conditions may be easily met west of the Cascades in Oregon and Washington. East of the Cascades, however, length of growing season may be too short to safely accommodate grazing except on very moist sites.

FOOD HABITS OF DEER AND CATTLE GRAZING IN COMMON ON A SAGEBRUSH-BUNCHGRASS RANGE IN NORTHEAST OREGON

T. O. Hilken and M. Vavra

STUDY AREA AND PROCEDURES

The study area, in the Keating Valley of Baker County, Oregon, historically was heavily grazed by cattle and sheep but not by mule deer. However, in the last 30 years there has been an increase in the number of mule deer and approximately 5,000 now use portions of the area between December and April. Cattle use occurs each spring and fall under Bureau of Land Management permits.

Three known areas where deer concentrated during the winter and cattle were grazed during the spring and fall were investigated. The vegetation of the three areas consisted of relic stands of three habitat types: (1) big sagebrush/bluebunch wheatgrass, (2) mountain big sagebrush/Idaho fescue, and (3) stiff sagebrush/Sandberg's bluegrass. Crested wheatgrass was an introduced seeded grass species and comprised more than 60 percent of the total herbaceous production where the seedings were successful. Cheatgrass brome, medusahead, Sandberg's bluegrass, and many weedy forbs such as white top, mullein, and mustards have invaded large portions of the area because of uncontrolled livestock grazing in the past and unsuccessful establishment of crested wheatgrass seedings.