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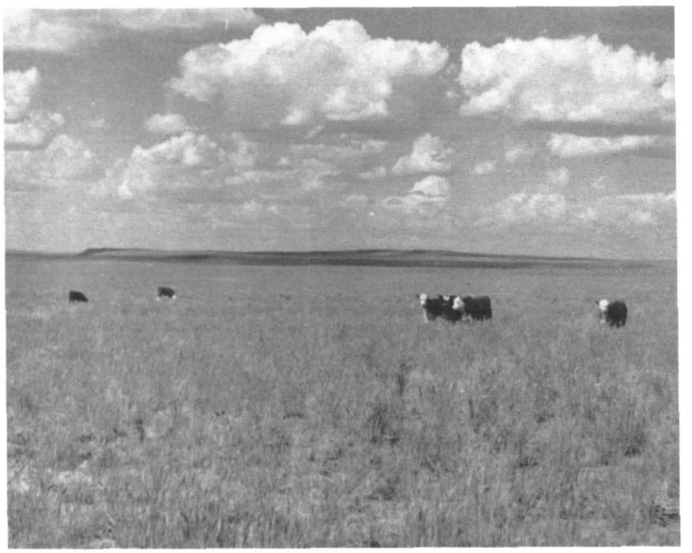
Alfalfa in Crested Wheatgrass Seedings

Robert R. Kindschy

Crested wheatgrass seedings have been criticized as being monotypic. Forbs such as legumes afford diversity and provide valuable summer forage to livestock and wildlife. White and Wight (1984), working in Montana, determined that crude protein concentration of alfalfas was almost twice that of grasses, and alfalfa produced nearly twice as much crude protein per unit of land. Several researchers have found that forage production is increased when a nitrogen fixing legume such as alfalfa is grown in association with seeded grass (Campbell 1963, Gomm 1964).



Addition of a perennial forb, such as alfalfa, to seedings of grasses increased both forage yield and plant diversity.

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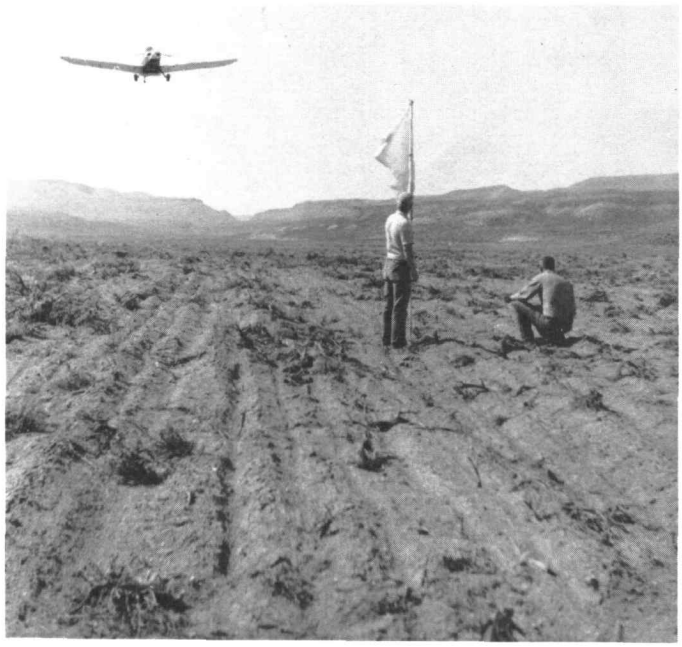
Rumbaugh (1984) determined that crested wheatgrass produced 183 percent as much grass foliage when grown with legumes, as when it was grown without legumes. In addition, the alfalfa plants contributed directly in a major way to a higher total forage yield. Rumbaugh also observed that where native legumes had been eliminated by overgrazing, the range site was not receiving the benefit of the nitrogen that could be added by the legume-mediated fixation process. Reintroduction of the native species or replacing them with improved strains or other adapted legumes could help restore the site to full productivity.

Rosenstock and Stevens (1989) studied the effects of herbivores on alfalfa seeded in the pinyon-juniper community of central Utah. They determined that although alfalfa had decreased during the 24 years since establishment, alfalfa remained an important and persistent component of the forage resource.

During a September 1961 tour of the Malheur County area, I was advised by E.R. Jackman, that 'Nomad' alfalfa had persisted as an excellent forage in the Paradise Valley region north of Winnemucca, Nevada, in a winter cattle feed-lot! The southeastern Oregon climate was quite similar and such a legume appeared to offer considerable potential for forage enhancement. A major opportunity for alfalfa seeding occurred during the Vale rangeland rehabilitation project (1962-1973) in the Bureau of Land Management's Vale District in southeastern Oregon (Heady and Bartolome 1977). Some one hundred thousand acres of crested wheatgrass seedings were also seeded to 'Nomad' variety dryland alfalfa. Seeding techniques were discussed by me (Kindschy 1974) in an often quoted but unpublished Bureau of Land Management report concerning dryland alfalfa seeding.



Dryland alfalfa was aerially seeded in the spring at approximately 1 pound per acre on ground plowed the previous spring and drilled to wheatgrass that fall.

'Nomad' alfalfa often became established in the interspaces between the drill-rows of seeded grass. It would normally remain succulent long after the grass had cured thus providing forage for both livestock and wildlife.

Alfalfa seedings in southeastern Oregon were accomplished in the following manner: The site was plowed during the spring of the year and then laid fallow during the summer. That fall, crested wheatgrass or a similar wheatgrass was drilled into the plowed soil. The following spring, alfalfa seed, which had been inoculated with the appropriate nitrogen fixing bacteria, was aerially seeded at approximately one pound per acre. This spring season seeding was normally accomplished after the danger of severe frost was past. The tilled soils were frost heaved and afforded frequent open pores and cracks for alfalfa seed penetration. The subsequent seeding was protected from grazing for two growing seasons.

In 1982, USDA Agricultural Research Service issued an informative publication (Agriculture Information Bulletin No. 444), *Alfalfa for Dryland Grazing,* where a number of the attributes and functions of alfalfa are discussed. Rumbaugh addressed the various strains of alfalfa. 'Nomad' was selected from a dryland site near Klamath Falls, Oregon at 4,500 ft. elevation with an average of 11 inches of precipitation. He observed that 'Nomad' was hardy but susceptible to bacterial wilt. A rhizomatous nature was noted. Rumbaugh also noted that seed of 'Nomad' was not available in 1977.

During 1987, Kathy O'Connor, a habitat biologist with the Vale District of the BLM, conducted belt transect analysis of the persistence of 'Nomad' alfalfa seedings within the northern portion of the Vale BLM district—the Malheur Resource Area. During 1988 and 1989, I followed up with analysis in alfalfa seedings of the southern portion of the district—the Jordan Resource Area. Together, our findings are supportive of continued mixed species seeding persistence over time.

O'Connor found a high of 2,382 alfalfa plants per acre in a 17-year-old seeding. Her findings varied, but the variance seemed independent of time or age of the seeding. Of the 23 seedings she examined, alfalfa was present in the vegetative component of over 23,000 acres seeded (75%). Seven seedings, representing approximately 7,600 acres that had been seeded to alfalfa, showed no alfalfa present (25%). My studies in southern Malheur County, Oregon, mirrored her findings. Together, 36 seeded sites were studied. The average stand was 427 plants of alfalfa per acre. The average age of the seedings studied was 21.7 years. There appeared to be no correlation between the age of the seeding and the persistence of alfalfa.

I believe that weather factors following seeding were most influential in effecting establishment of alfalfa. A severe frost following germination is lethal to alfalfa. This situation was known to have happened in two seedings with a result of no alfalfa establishment. Subsequent grazing management also played a role in survival of the plants. 'Nomad' alfalfa, however, is normally quite tolerant of cattle grazing in that it assumes a prostrate form under close utilization, thereby protecting itself from further grazing.

Persistence over time did appear to be related to grazing use. In the Jordan Resource Area, alfalfa within study exclosures (excluded from grazing by cattle) averaged 280 plants/acre whereas grazed seedings averaged 100 alfalfa plants/acre (Fig. 1). Within exclosures, the grass species seeded with alfalfa also seemed to be a factor in the amount of alfalfa present over time (Fig. 2). 'Whitmar' wheatgrass, a cultivar of bluebunch wheatgrass, allowed more alfalfa to co-exist than did 'Greenar' wheatgrass or 'Nordan' crested wheatgrass.

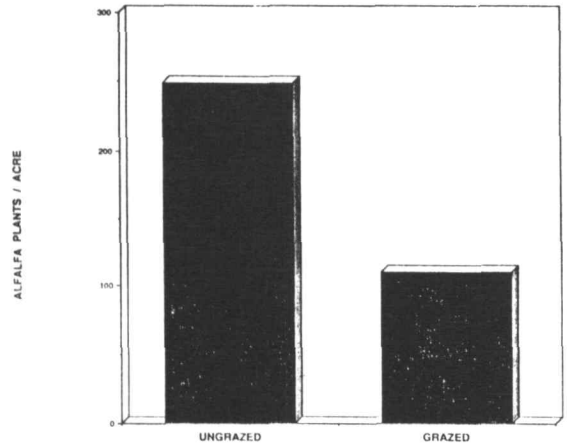


Fig. 1. *Number of alfalfa plants per acre was more than twice as great within protective exclosures than in seedings grazed by cattle.*

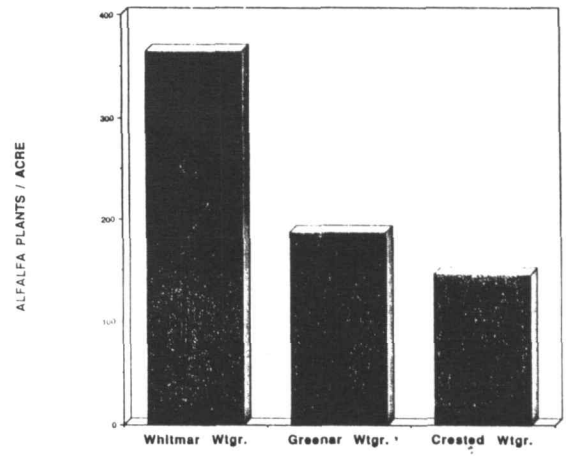


Fig. 2. *Grass species associated with alfalfa within livestock exclosures influenced the number of alfalfa plants per acre. 'Whitmar' wheatgrass, a cultivar of native bluebunch wheatgrass, usually was found to have more alfalfa associated in the stand.*

'Nomad' alfalfa normally forms seed. Recent grazing prescriptions in the Big Ridge Seeding north of Jordan Valley, Oregon, are now designed to favor trampling of alfalfa seed. It is thought that this important forb may, through proper grazing management, persist as a permanent component of the vegetation.

Resource values associated with nitrogen fixing legumes are obvious. More production from the nitrogen stimulated associated grasses and additional production due to the presence of the legume. Pronghorn and sage grouse, for example, have benefited from the presence of a green forb (in this case 'Nomad' alfalfa) during the drought of late summer. The potential productivity of pronghorn is influenced by sufficient green forage to stimulate ovulation. A persistent legume, such as alfalfa, may help fill this need which is especially important in marginal or peripheral habitat.

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