Interseeding for Pasture Improvement

Cooperative Extension South Dakota State University

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INTERSEEDING
PASTURES

Alfalfa seedings developing in native range in Harding County 4 months after interseeding in 1963.

Cooperative Extension Service
South Dakota State University
United States Department of Agriculture
INTERSEEDING FOR PASTURE IMPROVEMENT

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South Dakota's greatest natural resource is its grassland. However, a vast majority of the native pastures in eastern counties have been over-grazed to the extent that the more productive grasses have been eliminated and only the less productive remain. Likewise, 70% of the native rangeland is in only fair or poor condition.

Many acres can be improved rapidly by complete renovation and seeding of more productive grasses, yet many acres of rough and highly erodable or stony land must remain under present vegetation. Methods of improving these areas include deferred grazing, fertilization, weed control, and interseeding with more desirable grasses and/or legumes. One or more methods are applicable in almost every section of the state; each is discussed in a separate Fact Sheet.

WHAT INTERSEEDING IS

Interseeding is seeding a legume or more productive grass into a permanent grassland with minimum tillage of the existing sod (see figures 1 and 2). In some cases alfalfa may be interseeded to replace the native legumes that have been killed by misuse of the pasture. In other cases it may be interseeded into a tame grass sod. In each case the most important function of the legume is to take nitrogen out of the air and make it available in the soil where it can be utilized for increased quality and quantity of grass forage. The USDA estimates that a proportion of 35% alfalfa in a pasture will maintain the nitrogen content in the soil. In addition, the legume contributes to the yield of forage.

Mixtures of either sweet clover or alfalfa with grass produce more forage than either grass or legumes alone. Furthermore, protein content of grass grown in mixtures with legumes is higher than when grown in pure stands.

Interseeding of grasses may be done for several reasons. In some cases the condition of the grass may be so low that it does not respond to improved soil fertility resulting from interseeding legumes. More productive grasses that will respond can be interseeded.

In other situations, it may be desirable to establish a more productive grass in a poor pasture. Smooth bromegrass, for example, might be interseeded into a bluegrass pasture located on terrain that should not be tilled extensively.

In still other cases interseeding a grass may speed up pasture improvement that could be done with proper grazing management. For example, deferred grazing of a blue grama-buffalo grass pasture may allow western wheatgrass to become reestablished, but it might take several years. Interseeding with the better grass might bring the pasture into good condition in much less time.

Figure 1. A 3-year-old stand of alfalfa obtained by interseeding in native range in Lyman County.

Figure 2. Seedlings of grass interseeded into native range.
SUCCESSFUL INTERSEEDING

Stand establishment of interseeded crops depends on many factors. Time of seeding, type of equipment, rate of seeding, spacing, proper species, and varieties are the essentials.

Some farmers have obtained good alfalfa stands by applying heavy pressure on the disks of an ordinary grain drill and drilling the alfalfa into bluegrass sod. This method is sometimes successful if seeding is done when moisture conditions are favorable, very early in the spring, on pastures that have been heavily grazed the preceding fall. However, results are generally disappointing.

Eliminate all undesirable broad-leaved plants with herbicides before a legume is interseeded. If this is not done, the weeds may seriously impair the value of the legumes.

The value of using a starter fertilizer has not been adequately demonstrated for interseeding. A soil test may reveal that native grasslands are low in either nitrogen or phosphorus or both. If phosphorus is deficient and a legume is being interseeded, it is important that the phosphorus be applied, but place it in a band immediately below or to one side of the seed. A blanket application of fertilizer too frequently stimulates the existing vegetation, resulting in severe competition. If equipment is not available for band application, it is usually best to defer fertilization until after the seedlings are well established.

Deferred grazing is generally recommended following interseeding. It has been shown, however, that careful grazing can be beneficial. Existing sod may be grazed in the spring before new seedlings emerge and grazing may be continued until the livestock start to graze new seedlings. Such management reduces competition from old sod and allows seedlings to make normal growth.

SEEDING EQUIPMENT

Interseeding requires special equipment. The seed must be sown shallowly into a firm seed bed and competition from other plants must be removed from seedlings. Several types of machines give good results. Some are home-made and others are commercially built range interseeders. One type is shown in figure 3.

Each seeder must have several special features. One feature is an attachment mounted ahead of each seeding spout to remove a 4- to 12-inch strip of sod (wide strips in drier areas). The attachment may be a sweep (see figure 4), large disk, rototiller, herbicide applicator, or other device. The second essential is depth bands (see figure 5), gage wheels, or other system to ensure shallow seeding at a depth one-fourth to one-half inch. Packer wheels (see figure 6) are needed to
cover seed and firm the seedbed. Agitators in grass seed box (see figure 7) to move lightweight seed out of box and wide-mouthed feeder spouts that will allow feathery seed to flow freely are other essentials.

SEEDING RATE AND SPACING

Seeding rate need not be high. As a general rule the rate should be 25 to 30% as high as for a broadcast seeding. For small-seeded legumes, a rate of 1 pound per acre has been sufficient when seed placement was proper and weather conditions favorable.

The best distance between rows (furrows) has not been established. To date most interseeding of alfalfa in South Dakota has been in rows spaced 3 to 3½ feet apart (see cover). Row spacing will vary with conditions of the native pasture, annual rainfall and the intended use of improved grassland. In the central and western areas of the state, rainfall will not support a dense stand of alfalfa. A sparse stand will fulfill the primary objective of improving soil fertility, so that the existing grass will produce more forage. Consequently, wider row spacings are satisfactory. In areas of higher rainfall, a more dense stand of legumes can be maintained. In an extreme case it might be desirable to establish a dense stand of alfalfa in bluegrass sod and cut the legume for hay. Narrower row spacing and higher seeding rate would be required for this use. Narrow spacings can create an erosion problem in some areas.

The primary objective for interseeding grasses is not to improve soil fertility, but to establish a species that will produce more forage. Consequently, it may often be desirable to use narrower row spacings for grasses than for legumes.

ALFALFA VARIETIES FOR INTERSEEDING

Because of differences in their characteristics, some strains of alfalfa are better suited for grazing than others. Range and pasture plants must survive drought, severe winter conditions, disease, frequent removal of top growth, and trampling by livestock. Seedlings must have sufficient vigor to establish themselves in the range environment in competition with grasses already present. Ideally, introduced species should be capable of dispersion by vegetative processes as well as by seed.

Three varieties of alfalfa are recommended especially for grazing. They are Teton, Rambler, and Travois. Teton and Travois were developed in South Dakota and Rambler in Saskatchewan. All are winter hardy and suitable for interseeding anywhere within the state. Teton is a broad-crowned strain whereas Rambler and Travois spread by development of a new plant from a root at a distance from the original plant.
These latter two varieties are sometimes referred to as “creeping” or root proliferating alfalfas.

**HOW LONG DOES ALFALFA LAST?**

Alfalfa is known to be a long-lived perennial, but there is little information about its ability to survive in range for long periods.

Four plots were seeded in Harding County on a silty soil during 1953. They were double disked and seeded with Cossack, Ladak, Bison, and an unidentified yellow-flowered variety (probably Siberian or Semipalatinsk). The grass was not destroyed, but the area was grazed. In 1965 there were 3,530 plants per acre of Bison, 64 of Cossack, 806 of Ladak and 4,159 of the yellow-flowered variety. This demonstrates that a stand of alfalfa has been maintained for 12 years despite grazing by livestock and antelope for much of the period. Pasture-type varieties—Rambler, Teton, and Travois—are much more persistent to grazing than the hay-type varieties and are longer lived when interseeded in a native pasture.

**RESULTS FROM INTERSEEDING TRIALS**

Interseeding trials have been conducted at numerous locations in several counties. A variety of range sites, seeding dates, and seeding equipment was used. For experimental purposes, many techniques were used where the probability of failure was known to be high. Selection of favorable areas and use of well-designed implements would be expected to increase the chances of obtaining good stands.

**Brookings County.** Rambler, Semipalatinsk, Teton, Travois, and Vernal alfalfa were interseeded into bromegrass sod during April 1963 with a homemade planter. All varieties except Travois were interseeded in bluegrass sod during April 1964. In each case about 1 inch of rain fell the first week and over 3 inches the first month after seeding. In bromegrass sod an average of 51,319 plants per acre were present 1 month after seeding and 13,712 plants after 16 months and 10,086 plants after 26 months. There was no difference among varieties. In the bluegrass sod there were 93,790 alfalfa seedings per acre 2 months after seeding, 53,110 after 4 months, and 43,200 after 14 months.

**Deuel County.** During April 1964, Rambler, and Teton alfalfa were seeded in 4-inch-deep contour furrows in a bromegrass pasture. Dairy cattle were in the pasture all summer, but did not graze alfalfa seedlings until they were 8 inches tall when the bromegrass went dormant in August. Favorable rainfall conditions prevailed all season. Excellent stands of both varieties were obtained.

**Sanborn County.** Rambler and Teton alfalfa were seeded in bluegrass sod during April 1963. A good stand of both varieties was obtained and the protein content of the forage was increased 5% in 1964. In 1965 approximately 400 acres of pasture were interseeded in the county.

**Lyman County.** Ladak, Teton, and Travois alfalfa were interseeded into a buffalo grass sod during May 1961. A drill without sod strippers was used to seed the alfalfa into plots that were disked 0, 1, 2, or 3 times. Satisfactory stands of all varieties were obtained on plots that had been disked 1, 2, or 3 times to remove competition from existing sod during the early part of the 1961 season. Satisfactory stands were still present in 1965.

**Butte County.** Pasture-type alfalfas (Teton and Travois) were seeded on three different clayey range sites on three dates during 1961 and 1962 with commercially built grassland seeders. Drought during 1961 limited germination and much of the seed planted that year did not grow until the following spring. Over 8 inches of moisture fell in May 1962 to bring the monthly precipitation to 6 inches above normal, which was undoubtedly beneficial for legume stand establishment. In a sparse stand of western wheatgrass, buffalo grass, and blue grama grass, excellent initial stands of alfalfa were established from an August seeding on one site. On a similar site, no plants were established from August and October seedings, but 5,500 were established from an April planting. In a third site that had a denser cover of western wheatgrass, excellent initial stands of alfalfa were established from the three dates of planting. Subsequent intensive grazing by sheep eliminated the legume by the fall of 1965. There was no indication of lateral spread by either variety 3 years after seeding.

Five species of grass were planted in seven trials during 1961 and 1962. Two years after seeding, it was estimated that there was a 50% stand of crested wheatgrass. Estimates for other grasses were 30% for intermediate wheatgrass, Russian wildrye, and smooth bromegrass; 35% for green needlegrass; and 20% for western wheatgrass.

**Harding County.** Pan spot and silty sites were seeded with six alfalfa varieties in May 1963 with a homemade planter that consisted of John Deere flexi-planter units preceded by 6-inch cultivator sweeps to remove strips of existing sod. The sites were not completely protected from grazing by livestock and antelope. Approximately 4.8 inches of rain fell the first month after seeding and 16.18 inches fell during the first year.

From 1 pound of seed per acre, 18,364 to 52,972 plants per acre emerged from the six strains planted. During 1963 and 1964 the number of plants per acre gradually decreased until there were only 2,260 plants per acre in the pan spot site and 600 on the silty site. In September 1964, some legumes were present in all
plots. They were actively growing, thrifty, and in some instances were flowering and forming seed. There was no evidence of root proliferation by either Rambler or Travois. Flooding in 1965 eliminated all plants on the pan spot site.

Shannon County. Interseedings were made during April 1962 and 1963 and at three locations during October 1963. A single-disk grain drill, a double-disk grassland drill, and a flexiplanter preceded by 6-inch sweeps were used to seed an overflow and clayey range sites. There was good rainfall during the first month after both spring seedings and 14 to 17 inches of annual precipitation near each site. However, drought conditions during July and August 1964, as well as infestations of grasshoppers, contributed to rapid stand loss from 24,815 plants per acre in June 1964 to about 12,000 in July to zero in September.

Read these Fact Sheets for additional information on stand establishment, utilization, and improvement of grasslands:

- Grasses for Pasture and Hayland
- Planting Tame Pasture and Hayland
- Grazing Management Based on How Grasses Grow
- A Pasture System for You
- Fertilizing Forages
- Weed Control in Grasslands
- South Dakota Range—It’s Nature and Use
- “Proper” Range Use
- Reseed Native Range Grass? or Plant a Tame Pasture?
- Range Seedings
- Graze Longer and Feed Less Roughage
- My Rangelands—What Kinds? How Good?