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planting tame pastures and haylands

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Planting Tame Pastures and Haylands

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Good stands of grass and legumes for pasture or hay don't just happen. Their success depends on careful planning.

Specific practices can insure good stands. Some practices relate to seed: mixing legume and grass, selecting high quality seed, using proper seeding equipment, seed treatment, and inoculation of legumes. Other practices relate to soil management: proper preparation of seedbed, accurate time and rate of seeding, fertilization, use of companion crops, and land management by grazing or clipping in new pasture stands.

If you operate a farm in South Dakota, here is information about each of these practices that can help you plan good pasture stands or hay crops.

WHAT TO SEED

When seeding tame pasture or hayland select the best species for the area, the best variety of the species, and high quality seed.

Grass-Legume Mixtures

Grass-legume pasture mixtures are recommended because (1) they usually produce more forage, (2) they contain a higher percentage of protein than grass alone, (3) the inclusion of a grass (at least 50%) with a legume may reduce bloat on pasture, (4) grasses reduce soil erosion and improve soil structure, and (5) such a seeding gives more assurance of a stand. A grass-alfalfa mixture should not contain more than 50% alfalfa if used for pasture and not less than 50% alfalfa if used for hay.

Research shows that adapted tame grasses produce more than twice as much pasturage or hay than native grasses, either under dryland or irrigation conditions. Land that is rough and highly erodible, stony, or low and wet should remain in the more permanent type grasses. Tillable land used for pasture or hayland should be seeded to a tame grass-legume mixture.

Use High Quality Seed

High quality seed is mature, plump, pure, and of high germination. Plump, high test weight seed produces larger and stronger seedlings. Seedling vigor is important in establishing successful stands.

So-called "bargain" seed is often the most expensive. Purchase seed on the basis of "pure live seed" (PLS). The percent of pure live seed is determined by multiplying purity times germination.

Example: Grass seed: Sample A has a purity of 60%, a germination of 80%, and a "bargain" price of 20 cents per pound. The percent of pure liveseed is 48 (60% x 80%). On the basis of pure live seed, this seed costs about 42 cents a pound (20 cents divided by 48%). Sample B has a purity of 90%, a germination of 90%, and a price of 30 cents a pound. The percent of pure live seed is 81 (90% x 90%) and the pure live seed cost is 37 cents per pound (30 cents divided by 81%). On the basis of PLS sample A costs 5 cents more a pound than sample B.

Recommended Species

Some cool-season grasses start growth early in the spring and others start later. Most go dormant during July and August and resume growth in the fall if moisture conditions are favorable. Warm-season grasses start growth during late spring and produce maximum forage during July and August. Therefore, it is often desirable to have four pastures: one for early spring (April and early May), a second for late spring and summer (mid-May to August), a third for supplemental pasture in mid-summer (July and August), and a fourth for fall (September and October).

Allow each pasture to produce some growth before it is grazed. If a mixture of cool- and warm-season grasses is seeded, early growth of warm season grasses will be grazed at the same time as well developed growth of cool season grasses. The warm season grasses do not get a good start before grazing begins.

Alfalfa is the best legume for pasture or hayland.

Birdsfoot trefoil may be used instead of alfalfa for pasture in areas where rainfall is favorable. It winter kills more readily than alfalfa. While birdsfoot eliminates the bloat problem in pastures, stands are more difficult to obtain and take longer to establish than alfalfa.

Sweetclover and red clover may be used in the mixture especially in short pasture rotations.

Table 1 shows the grasses and legumes best adapted for several types of soil for use in early spring, late spring and summer, mid-summer and

Table 1. Species Adapted for Pasture and Hayland Plantings

Grass Species	Types of Soil in Crop Adaptation Areas*						
	Sandy	Loam	Clay	Imperfectly Drained	Poorly Drained	Saline	Alkaline
EARLY SPRING							
Crested wheatgrass	B	B	B	-------	-------	-------	-------
Russian wildrye	B,C,D,E	A,B,C	B,C,D,E	A	-------	-------	-------
Orchardgrass†	A,C,D,E	A,C,D,E	A,C,D,E	A	-------	-------	-------
Siberian wheatgrass	A,B	A,B	A,B	-------	-------	-------	-------
Reed canarygrass‡	-------	-------	-------	A,B,C	A,B,C	-------	-------
Alfalfa	A,B,C,D,E	A,B,C,D,E	A,B	-------	-------	A,B,C,D,E	-------
Birdsfoot trefoil	-------	-------	-------	A,D,E	-------	-------	-------
LATE SPRING AND SUMMER							
Smooth bromegrass	A,C,D,E	A,C,D,E	A,C,D	A,B,C,D	-------	-------	-------
Intermediate wheatgrass	A,C,D,E	A,B,C,D,E	A,B,C,D,E	A,B,C,D,E	-------	-------	-------
Pubescent wheatgrass	A,C,D,E	A,B,C,D,E	A,B,C,D,E	A,B,C,D,E	-------	-------	-------
Reed canarygrass	-------	-------	-------	A,B,C	A,B,C	-------	-------
Meadow foxtail	-------	-------	-------	A,B,C	A,B,C	-------	-------
Tall wheatgrass	-------	-------	-------	-------	-------	A,B,C,D	A,B,C,D,E
Alfalfa	A,B,C,D,E	A,B,C,D,E	A,B	-------	-------	A,B,C,D,E	-------
Birdsfoot trefoil	-------	-------	-------	A,D,E	-------	-------	-------
Sweetclover	A,B,C,D,E	A,B,C,D,E	A,B,C,D,E	-------	-------	A,B,C,D,E	-------
Red clover	-------	A,D,E	A,D,E	A,D,E	-------	A,D,E	-------
MID-SUMMER							
Sudangrass	A,C,D,E	A,B,C,D,E	A,B,C,D,E	-------	-------	-------	-------
Switchgrass	A,C,D,E	D,E	-------	A,B,C,D,E	-------	A,C,D,E	-------
Big bluestem	-------	A,B,C,D,E	-------	A,B,C,D,E	-------	A,C,D,E	-------
Indiangrass	D,E	D,E	-------	A,B,C,D,E	-------	C,D,E	-------
FALL							
Russian wildrye	B,C,D,E	A,B,C	B,C,D,E	A	-------	-------	-------
Crested wheatgrass	B	B	B	-------	-------	-------	-------
Reed canarygrass	-------	-------	-------	A,B,C	A,B,C	-------	-------
Alfalfa	A,B,C,D,E	A,B,C,D,E	A,B	-------	-------	A,B,C,D,E	-------
Birdsfoot trefoil	-------	-------	-------	A,D,E	-------	-------	-------

*Crop adaptation area shown in Figure 1.
†Not as long-lived or winter hardy as smooth bromegrass. A good snow cover promotes good winter survival and earlier spring growth. Recommended for use only under irrigation or on sub-irrigated land.
‡Should not be grazed if turf is soft from excessive moisture.

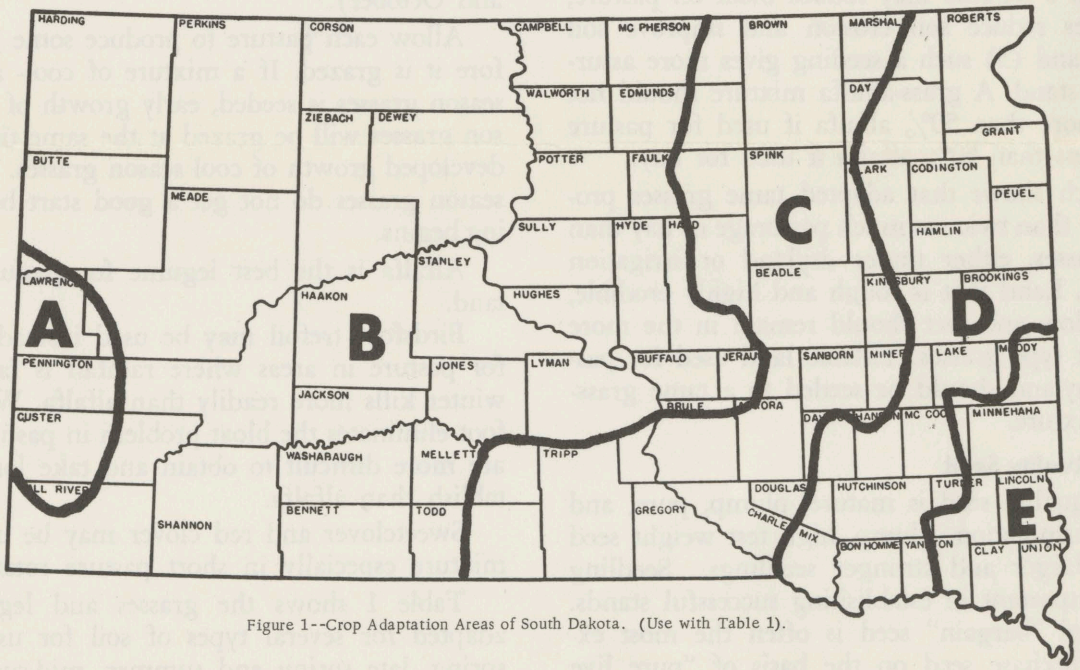

Figure 1--Crop Adaptation Areas of South Dakota. (Use with Table 1).

Table 2. Minimum Pounds (PLS) for Seeding Pastures and Hayland

Species	Seeds per pound	Minimum pounds (per acre) for fall seeding	Number of Seeds per Running Foot at Various Row Spacings 6″	7″	8″	10″	42″*
GRASSES							
Big bluestem	153,000	5.0	9	10	12	15	31
Crested wheatgrass	175,000	3.7	7	9	10	12	26
Meadow foxtail	613,000	1.4	10	11	13	16	35
Indiangrass	165,000	5.0	9	11	13	16	33
Intermediate wheatgrass	88,000	7.5	8	9	10	13	26
Orchardgrass	654,000	1.4	11	12	14	18	37
Pubescent wheatgrass	100,000	6.6	8	9	10	13	27
Reed canarygrass	533,000	3.2	20	22	26	32	68
Russian wildrye	175,000	3.7	7	9	10	12	26
Siberian wheatgrass	170,000	3.9	8	9	10	13	27
Smooth bromegrass	136,000	4.8	7	9	10	12	26
Sudangrass	55,000	18.0	11	13	15	19	40
Switchgrass	370,000	5.0	20	24	28	37	75
Tall wheatgrass	79,000	8.2	7	9	10	12	26
LEGUMES							
Alfalfa	200,000	3.3	8	9	10	13	26
Birdsfoot trefoil	375,000	2.4	10	12	14	17	36
Red clover	275,000	3.2	10	12	14	17	35
Sweetclover	260,000	2.5	7	9	10	12	26
White clover	800,000	1.0	9	11	12	15	32

*When seed is planted in 42-inch rows for seed production or range interseeding, about one-half the rate for a full seeding is needed. Amounts shown in the 42-inch column have been reduced accordingly.

fall for the crop adaption areas indicated by figure 1. Several native grasses are listed for mid-summer use because no warm-season tame grasses are available. The species listed for late spring and summer are those suggested for use in haylands.

Recommended Varieties

Alfalfa. Most alfalfa varieties were developed for hay production. Vernal, Ranger, and Ladak are excellent for use in hayland mixtures, but are not well adapted for grazing. The first year after seeding, a grass-alfalfa mixture generally has more than 50% alfalfa and there is danger from bloat. After the first year, the stand of grass tends to become thicker and the bloat problem decreases, as the stand of alfalfa gradually declines.

Rambler, Teton and Travois are alfalfa varieties developed for use in pasture mixtures. (Teton and Travois were developed in South Dakota). Because plants do not grow erect and recover slowly after grazing, the forage in a mixture is predominantly grass. This reduces the hazard of bloat. On the other hand, these varieties withstand considerable grazing and stands are maintained in pastures for several years. Seed of Rambler is generally available, seed of Teton is available in limited quantities and seed of Travois should be available by 1967.

Other legumes. Recommended varieties of other legumes are:

Birdsfoot trefoil — Empire
Sweetclover — Denta, Goldtop, Madrid
Red clover — Dollard, Lakeland

Cool season grasses. Selecting adapted, recommended varieties is important. Southern varieties or strains lack winter hardiness. Some northern strains do not withstand hot, dry summers. Disease susceptible, non-hardy, or drought susceptible varieties are usually short-lived under pasture conditions. Recommended varieties of adapted species are:

Smooth bromegrass — Homesteader, Lincoln, Lancaster
Intermediate wheatgrass — Amur, Greenar, Oahe
Crested wheatgrass — Fairway, Nordan
Pubescent wheatgrass — Mandan 759
Tall wheatgrass — PI 98526
Russian wildrye — Vinall
Reed canarygrass — no specific variety
Orchardgrass — no specific variety
Meadow foxtail—Garrison

Warm-season grasses. There are no tame grasses in this group. However, Summer and Nebraska 28 are improved strains of native switch grass. The only recommended variety of sudangrass for mid-summer pasture is Piper. For native switchgrass, indiangrass and bluestem, use seed that originated not over 150 to 200 miles north and not over 250 to 300 miles south of the area where seeding is made. Seed should come from an area of similar rainfall, seed produced on sands should not be seeded on clay soils, nor should strains produced on moist lowlands be seeded on dry upland.

SEEDING

After selecting your seed, questions arise as to when and how to seed tame pastures or hayland.

Time of Seeding

Early spring (before April 15) is the common seeding time and is better than late spring. It takes about 30 days for a grass or a legume to germinate and become well established. The cool, moist conditions of early spring are favorable for germination and seedling growth.

Cool season grasses can be seeded from August 15 to September 20 if good moisture conditions prevail. Early fall or late summer planting on summer fallowed land is satisfactory because of the conservation of moisture. A light seeding of oats may serve as a cover crop to prevent soil erosion. Late August plantings allow the grass and legumes to become established before the soil freezes and the seedlings have a much better chance of surviving the winter. It must be stressed that grasses are much less risky to establish at this time than legumes as they must have ample time to build-up root reserves for the winter.

Very late fall seeding (after November 15) of cool-season grasses may be made after probability of germination is passed. The seed is then ready to germinate when spring growing conditions arrive.

Seedbed Preparation

Prepare a firm (hard) seedbed so that the small seeds may be planted at a uniform, shallow depth.

The seedbed should be firm enough for a man to walk across it without sinking into the soil more than a quarter of an inch.

There are several satisfactory methods of preparing a seedbed:

1. Plow, disk, harrow and pack to work out air pockets. Plant with a seeder that has depth controls.
2. Fallow throughout the summer. If stubble mulch was maintained, pack it thoroughly. Poor stands of alfalfa frequently result from planting in stubble mulch.
3. Use a clean undisturbed stubble from small grain, sudangrass or close-drilled sorghum that is practically free of weeds or volunteer grain.
4. Plant a cover crop, susceptible to winter-killing, during early fall on fields that have been fallowed without maintaining a cover of crop residue. Seed with a drill during late fall after cover crop has winter-killed.

Depth of Planting

Seedlings do not emerge if seed is planted too deep. Seed shallow, yet be sure the seed is covered. Seed germinating on top of the ground has a poor chance of survival. Plant ½ to ¾ inch deep on loams, silty clay loams and silty clay soils, and 1 to 1½ inches deep on loamy sands and sandy loam soils.

Equipment for Seeding

Proper equipment for seeding small seeds is the first essential in establishing stands. Use equipment that packs the soil around the seed after it is planted. Packing puts the seed in contact with soil, prevents soil from drying out, and facilitates capillary rise of soil moisture near the soil surface for the germinating seedling.

A cultipacker seeder is a superior type for seeding legumes or small-seeded grasses on crop-residue-free areas such as plowed or clean fallowed land. Lightweight seeds — smooth bromegrass or wheatgrasses — may not be covered on any type of seedbed and smaller seeds may not be covered on areas that have good crop residues.

A press drill is best to use on fields with considerable crop residue. A press drill is also excellent on plowed or clean fallowed land if depth bands are used to give uniform shallow seeding. Light weight grass seeds — smooth bromegrass or wheatgrasses —may "bridge-over" in the drill box and not feed down the spouts. Mix the grass seed with cracked corn or oats (⅓ oats and ⅔ grass) or use an agitator in the seed box to prevent "bridging-over."

A grain drill without press wheels can be used satisfactorily on plowed or clean fallowed land. However, it should be equipped with depth bands. Prevent "bridging-over" and pack the field after seeding, but remember that packing is often conducive to wind erosion.

A broadcast seeder is usually the poorest implement for seeding. It can be used for seeding forage legumes on plowed or clean fallowed land if the seed is harrowed in. However, it is seldom satisfactory for seeding smooth bromegrass or wheatgrasses because they are difficult to cover properly.

Rates of Seeding

Table 2 gives the minimum rates of seeding for several species of grasses and legumes.

Legume Inoculation

Legume seed inoculation is always recommended. Inoculation assures that (1) nodulation will occur early in the life of the legume plant, (2) that all plants will have nitrogen-fixing bacteria available, and (3) that the most efficient strains of nitrogen-fixing bacteria are present. Inoculate seed just before planting.

Seed Treatment

Grasses: To control harmful disease organisms

on grass seed, use one of the treatments listed in table 3.

Legumes: Use one of the treatments listed in table 4. Treat this seed about one week before planting to avoid injury to the bacterial inoculant applied at seeding time. Inoculate just enough of the treated seed to fill the drill box. Plant immediately. **Do not treat previously inoculated seed.**

Companion Crop

In areas of limited rainfall, companion crops (nurse crops) are not recommended except on soils where erosion is a hazard. Flax is considered the best companion crop, but early maturing small grains may be used. Reduce the rate of seeding of the companion crop by one-half of the normal seeding rate for the area.

Fertilization

Phosphate is not needed for grass seedings and is generally not needed for establishment of legumes. Prior to seeding and plow down a good practice on soils low in phosphate is to apply the quantity of fertilizer needed for duration of the legume stand. However, this application is for production rather than to obtain a stand.

Nitrogen is needed for grass and legume establishment only under special conditions such as on sterile subsoils exposed by erosion or land leveling. Use 20-30 pounds of available nitrogen per acre when these conditions exist. Best results are obtained when fertilizer is placed in a band directly under the seed.

Table 3. Seed Treatment for Grass Seeds

Fungicide	Rate	Formulation	Application Method (treater)
Arasan 50-Red	8 oz./100 lbs.	Dust	Rotary or gravity
Arasan SF-X	2¾ lbs./gal. water	Dust	Slurry
Captan 75	8 oz./100 lbs.	Dust	Rotary or gravity
Captan 75	5½ oz./100 lbs.	Dust	Slurry

Table 4. Seed Treatment for Alfalfa and Small Seeded Legumes

Fungicide	Rate	Formulation	Application Method (treater)
Arasan 50-Red	8 oz./100 lbs.	Dust	Rotary or gravity
Arasan SF-X	3 lbs./gal. water	Dust	Slurry
Captan 75	8 oz./100 lbs.	Dust	Rotary or gravity
Captan 75	5½ oz./100 lbs.	Dust	Slurry

Use of a trade name does not imply endorsement of that brand over another.

Management of New Seedings

Remove a companion crop as soon as it is ripe. Harvesting the small grain for hay or silage is a good practice because this eliminates the competition for moisture, sunlight, and plant nutrients.

When a companion crop is not used, clipping any weed growth may be necessary. Do not let weeds make too much growth, as the excessive clippings may smother the young grass and legume seedlings. The height of the clipping will depend on the height of the seedlings. Do not cut off the small plants.

New seedings should never be pastured the first season. The new stand needs to develop its root system and store food reserves in the roots.

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

- Grasses for Pasture and Hayland
- Improvement of Worn-Out Pastures
- Pastures for Maximum Production
- "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?

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