

Seeding Permanent Pastures

E. MARION BROWN*

The successful establishment of a new permanent pasture requires the choice of crops that are well adapted to the soil and climate, the use of good seed, a well prepared, firm seedbed, an even distribution and shallow covering of the seed, and sowing at the correct time of year. Applications of fertilizer and lime will usually facilitate the establishment of new seedings and increase the productivity and quality of the pasture grasses for several years.

Choice of Seed Mixtures

The seed mixture should contain at least one perennial grass and one legume. Timothy, because it is quickly and easily established, because the seed is inexpensive, and because it is palatable and nutritious, should be added to mixtures that include more slowly developing grasses such as Kentucky bluegrass or bromegrass, unless the latter grasses are to be harvested for seed. Small quantities of redbtop or Canada bluegrass seed should be added to mixtures that include orchard grass as the principal ingredient if the soil is marginal in fertility for orchard grass or if there is no intention of plowing up and reseeding the pasture when the stand of orchard grass becomes thin.

The following mixtures are suitable for soil conditions and purposes indicated. Seeding rates are given in pounds per acre.

1. For permanent pasture on fertile, well drained soils:

Kentucky bluegrass—10 pounds
Timothy—5 pounds
Sweet clover or Korean lespedeza—10 pounds
or
Smooth bromegrass—10 pounds

Timothy—5 pounds
Alfalfa, sweet clover, or Korean lespedeza—10 pounds

Note—Omit timothy and sweet clover from mixtures that are to be harvested for seed. If timothy is not included, increase bluegrass or bromegrass to 15 pounds. Domestic grown seed of bromegrass originating in the central latitudes should be used.

2. For permanent pasture on well drained soils, medium in fertility:

Orchard grass—10 to 14 pounds
Redtop or Canada bluegrass—1 to 5 pounds
Korean lespedeza—10 pounds

Note—The proportion of redbtop or Canada bluegrass in the mixture should be larger on the poorer soils, smaller on the better soils.

3. For permanent pasture on well drained soils, low in fertility:

Redtop—10 pounds
Canada bluegrass—1 to 3 pounds
Korean lespedeza—10 pounds

Note—Canada bluegrass should be omitted when the seed is unusually high in price or if seed free from Canada thistle and other noxious weeds is not available.

*Agent in cooperative pasture research, Missouri Agricultural Experiment Station and the Division of Forage Crops and Diseases, Bureau of Plant Industry, United States Department of Agriculture.

4. For permanent pasture on lands that are wet, poorly drained, or subject to overflow:
 - Redtop—10 pounds
 - Alsike clover—3 to 5 pounds or Korean lespedeza 10 pounds
 - or
 - Redtop—5 pounds
 - Timothy—5 pounds
 - Alsike clover—3 to 5 pounds or Korean lespedeza 10 pounds
5. For pastures to last only 3 to 5 years on medium to fertile soils:
 - Orchard grass—15 pounds
 - Korean lespedeza—10 pounds
 - or
 - Timothy (if seeded in the fall)—5 pounds
 - or Timothy (if seeded in the spring)—10 pounds
 - Korean lespedeza—10 pounds

When grown in mixtures with perennial grasses, Kobe, Tennessee 76, or other improved selections of common lespedeza are equal to Korean lespedeza in yield and quality and are even better able to withstand the competition offered by the grasses. Improved strains of common lespedeza can, therefore, be substituted for Korean lespedeza in seed mixtures to be used in the southern half of Missouri, but because of their later maturity, they should not be used in the northern half of the State.

Seed Quality

Only seed having a high percentage of germination, free from trash and weed seed, should be used. Under no circumstances should grass or legume seed that contains noxious weed seed be planted.

Time to Sow

Better results are usually obtained if the grasses (Kentucky bluegrass, bromegrass, timothy, redtop, Canada bluegrass) are seeded in late summer or very early fall (August 20 to September 5 in the northern part of the State, August 25 to September 10 in the central part, September 1 to 15 in the southern part). Orchard grass, because it is more susceptible to winter injury in the seedling stage than other adapted grasses, should be sown in the spring in the northern half of the State, but in the southern half, orchard grass, too, should be seeded in late August or early September. Korean lespedeza, sweet clover, and alsike should *not* be sown with grass in August or September.

If the grass is seeded in late August or early September, unhulled sweet clover should be broadcast in the young grass during December or January; lespedeza, either Korean or common, can be seeded in the grass at any time from early December to late March; but scarified sweet clover or alsike clover should not be seeded until March. Alfalfa can be sown along with bromegrass in late summer, but the chances of its successful establishment diminish rapidly as the date of seeding is delayed beyond September 1.

If the pasture mixture is sown in the spring, sow the grasses and legume together during March.

Seedbed Preparation

Small-seeded grasses and legumes make a slow early growth, and during early stages of development are poorly equipped to compete with weeds or to withstand rapid drying of the soil. Therefore, a

well prepared seedbed, one that is pulverized at the surface, but firm and free from weeds, greatly improves the chances of establishing good stands of the pasture mixtures.

Plowing will usually be necessary except where soybeans have just been removed from the land. The harrow, disk and corrugated roller can all be used advantageously to smooth, pulverize, and pack the soil. The specific methods to be employed will be determined by the nature of the soil and the farm implements available.

Method of Seeding

Timothy and redbud seed and the seed of legumes recommended for use in pasture mixtures will feed readily through the grass seeder attachment of a grain drill, the alfalfa-clover drill, or broadcast seeders. Clean, heavy bluegrass seed can also be drilled or broadcast by ordinary seeding machinery, but chaffy or trashy bluegrass seed and all except the finest quality of bromegrass and orchard grass seed must either be broadcast by hand or mixed with the heavier seed of oats, barley, wheat, or rye, to get the grass seed to feed through a grain drill or the hopper of an endgate seeder.

Whether broadcast or drilled, the seed should be uniformly distributed at the recommended rate and covered from $\frac{1}{2}$ to $\frac{3}{4}$ inch deep. Rolling the land with a corrugated roller just before and immediately after the seed is broadcast covers the seed at the desired depth and brings it in close contact with the soil. Harrowing with the harrow teeth set nearly horizontal is almost as satisfactory a method of covering the broadcast seed as is rolling.

Soil Treatment

The productivity and quality of the pasture will be improved if agricultural limestone is added to soils that are more than moderately acid. If sweet clover or alfalfa is used, the full lime requirement of the soil as indicated by test must be satisfied by applying limestone to the soil from 6 to 12 months in advance of seeding. If liming does not precede the seeding of sweet clover or alfalfa by at least six months, either fine lime, or a portion of the 10-mesh limestone should be drilled with the seed.

The majority of soils on which permanent pastures are established in this State are seriously deficient in phosphorus. On such land, both the productivity and stand of the grass mixture will be increased by the application of phosphate fertilizer at the time of seeding, and this improvement can be expected to last for at least 5 years. From 200 to 500 pounds of 20 per cent superphosphate (0-20-0) or equivalent amounts of fertilizer containing higher or lower percentages of phosphorus, should be drilled into the soil immediately before or at the time of sowing the grass.

If the soil is very deficient in organic matter and low in general fertility, the initial stand of grass and its subsequent productivity will be materially increased by applying a complete fertilizer (4-16-4 or 4-12-4) at the rate of 200 to 300 pounds per acre, or by spreading barn yard manure after plowing, and working it into the soil during the process of seedbed preparation. If manure is used it will still be necessary to add phosphate, but not nitrogen and potash.

Use of a Companion Crop

A companion crop should be seeded with the grass mixture *only* if the land is subject to severe erosion or in order to add enough weight to the seed mixture to insure ready feeding through a drill or endgate seeder. Oats is the best crop to use with either the late summer or spring seeding of the grass mixture, although seedings are often made successfully with wheat, winter barley, or rye. If a spring variety of oats is sown in late summer, winter injury will kill or weaken them enough to prevent serious competition between the grass and companion crop during the following spring. If oats are used with a spring seeding of pasture grasses, the companion crop should be sown at a rate of not more than one bushel of seed per acre, and it should be grazed sufficiently during the spring to prevent excessive shading of the young grass. The companion crop should always be pastured off or cut for hay before it matures.

Reseeding Untillable Pastures

It is either inadvisable or impossible to plow many old pastures from which tame grasses have largely disappeared. Without plowing and the other tillage operations required to make a good seed-bed, however, satisfactory initial stands of pasture grasses are not likely to be obtained regardless of the amount of seed or the method of seeding used. Good stands of Korean lespedeza can, however, be established without tillage in old pastures, merely by broadcasting the seed some time during the winter. Sweet clover can also be established by broadcasting unhulled, inoculated seed during December or January if the land has been adequately limed, but the establishment of sweet clover under these conditions is less certain than the establishment of lespedeza. The rate at which lespedeza or sweet clover should be seeded in old pastures is 25 pounds of seed per acre.

The most effective method by which grass can be restored to old pastures that cannot be plowed but over which a drill and lime-spreaders can be drawn is to add lime and phosphate and sow lespedeza or sweet clover. The added mineral plant foods plus the nitrogen gathered from the air and left in the soil by the lespedeza or sweet clover will encourage the spread of any remnants of sod-forming grasses such as Kentucky bluegrass, redtop, Canada bluegrass, or brome grass that remain in the pasture. If none of these grasses exist even in thin, scattered stands, broadcast some seed of one or more of them during the winter. It will be useless, however, to sow under these conditions either Kentucky bluegrass or brome grass without first applying lime and phosphate and establishing one of the legumes. If lime and fertilizer cannot be applied, sow redtop or Canada bluegrass a year or two after Korean or common lespedeza has been established.

Orchard grass is not recommended for seeding in untilled pastures, except in partly wooded areas, because thin stands of this "bunch" grass do not thicken unless there is enough shade to retard the development of competing grasses and weeds. Orchard grass is not, however, sufficiently shade tolerant to thrive where the stand of trees or brush is dense enough to form continuous shade.