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PLANT MATERIALS TECHNICAL NOTE

ORCHARDGRASS *Dactylis glomerata* L.: An Introduced Conservation Grass for Use in Montana and Wyoming

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Figure 1. Orchardgrass

Orchardgrass was introduced into North America from Europe about 1760, and is now common throughout the continent, where it occupies an important place as a cultivated grass for hay and pasture. It is commonly found growing in the shade of orchards in the eastern United States, which undoubtedly led to its most widely-known, common name.

Description

Orchardgrass is a medium- to long-lived, perennial bunchgrass with a dense, deep, fibrous root system. Unless grazed or mowed, it grows in clumps to form tussocks. It is readily distinguished by its large circular bunches, folded leaf-blades, and compressed sheaths. The soft, light-green leaves are predominantly basal, with some leaves on the flowering culm. Seeds are borne in a moderately compact-to-open panicle, 4 to 10 inches long, on a stalk 2 to 5 feet tall (see Figure 1). Tillering occurs almost continuously, and within a single clump, tillers will be in all stages of development. Total root production is at least 5,000 pounds per acre in the upper 8 inches of soil. Spring growth begins in late March or early April, and is not checked by high summer temperatures. This grass develops about one month earlier than timothy (*Phleum pratense* L.).

Adaptation

Orchardgrass is grown, to some extent, in nearly every state in the United States. It is used most heavily in the Pacific Northwest and northeastern states. It is not as winter hardy as other pasture species, but does well where there is sufficient snow cover. This grass is adapted to sub-humid or irrigated conditions on medium-textured, well-drained, fertile soils that are calcareous, neutral, or moderately acidic. Under dryland conditions, it requires 18 to 25 inches of annual precipitation, with the exception of 'Paiute', which was specifically selected for its drought hardiness. However, testing at the University of Wyoming Sheridan Research and Extension Center showed 'Paiute' requires at least 15 to 16 inches of annual precipitation to maintain a stand under dryland conditions. It is only recommended for irrigated production or low-lying areas with supplemental sub-irrigation when planted in eastern Montana and Wyoming. Orchardgrass performs best in a pH range of 5.8 to 7.0, but will persist up to 8.0. Spring frost will not kill orchardgrass, but it does reduce overall production. In areas with significant spring frosts, such as mountain valleys, meadow brome (*Bromus marginatus*) is a better choice.

Limitation

Lack of winter hardiness limits the use of orchardgrass in parts of the northern United States and Canada; however, more hardy cultivars are being developed. Orchardgrass requires soil with good internal drainage, thriving in low-lying areas, but only if well drained. It tolerates only moderate salinity, i.e., less than 9 millimhos per centimeter (mmhos/cm).

Use for Hay

Orchardgrass grows tall enough for easy harvesting as a hay crop. Although it is aggressive, its bunch habit of growth allows legumes to grow well with it in mixtures, provided the seeding rate of the orchardgrass is not too high. Orchardgrass grown alone will produce an average hay yield from 1 to 3 tons per acre, but when grown with clover or alfalfa, yields of 3 to 5 tons per acre can be expected. An irrigated forage study established in 2004 at the Bridger Plant Materials Center had orchardgrass averaging 5,470 pounds per acre when planted alone and 10,002 pounds per acre when planted in alternate rows with alfalfa. Two harvests were taken in 2005, and three harvests in 2006. When grown with a legume, the nitrogen requirements are greatly reduced. Re-growth is rapid, so it provides good second cutting yields, or good late summer grazing. Harvesting should be done when the orchardgrass is fully headed, but prior to bloom. Haying after bloom causes seed shatter during harvest and, subsequently, a significant increase in the amount of orchardgrass in the field. Increased competition from the early-spring growth typically chokes alfalfa out of the stand in about two years under irrigated conditions.

Use for Pasture

Orchardgrass is a preferred pasture forage wherever it is adapted because of its early spring growth and its rapid recovery following grazing. It has excellent re-growth during the hot summer months when other grasses are not as productive. This plant responds well to a rotation-deferred grazing system (see Figure 2). With adequate moisture, fall growth is good. The best yields from orchardgrass or orchardgrass-legume pastures are achieved when livestock are allowed to graze when growth is about 8 to 9 inches high, and then removed when the stubble height reaches 4 inches. Since the main food storage of orchardgrass is in the lower stems and leaf parts, it does not tolerate close and continuous grazing. As with hay production, the use of orchardgrass for pasture is best when it’s planted in a mix with a legume, such as alfalfa, at ½ to 1 pound PLS per acre. Planting the alfalfa at a higher rate increases the chance of bloat in ruminant livestock and prevention supplementation may be needed. Adding another grass to the mix, such as meadow bromegrass (*Bromus biebersteinii* Roemer and Schultes) will maintain or slightly increase

production. This is especially true if periods of very hot weather occur during the summer months because meadow bromegrass is more heat tolerant than orchardgrass.

Figure 2. Orchardgrass pasture on a rotational grazing system.

Post-Fire Re-seeding

Orchardgrass is an excellent choice for re-seeding both private and public land that has been affected by a wildfire. A Natural Resources Conservation Service (NRCS) study demonstrated the quick establishment and resulting soil protection by orchardgrass following wildland fires (see Forestry Technical Note, MT-29). Although seeding an introduced grass on public land is generally not recommended for fear of spread, no orchardgrass plants remained at the planting site 10 years after seeding. This stand loss demonstrates the lack of drought tolerance characteristic of orchardgrass in environments receiving less than 16” of annual precipitation. In addition, wildlife ungulates readily prefer orchardgrass and grazing pressure may also contribute to its rapid stand decline.

Seed Production

When planting for seed increase, the recommended between-row spacing in Montana and Wyoming is 22 to 30 inches. Seeding rate is 1.5 to 2 pounds per acre pure live seed (PLS) in order to achieve 25 to 30 live seeds per linear foot of row. Seed of orchardgrass generally reaches maturity during the middle of July. Upon maturity, the seed head turns yellow, although the culms and leaves remain green. Seed can be direct combined or combined from a windrow after curing for several days. If direct combining, the header should be raised as high as possible to minimize processing the still succulent stems and leaves through the machinery. Windrowing followed by combining is the preferred method of harvest. When direct combining, the seed should be dried to 12% moisture in bins and 15% moisture in sacks before storing.

Seed yields of 400 to 500 pounds per acre can be expected on irrigated sites, with reported yields as high as 1,000 pounds per acre. Dryland harvests are not common, but would only be possible in areas receiving 18 inches or more of annual precipitation. Seed yield responds well to nitrogen fertilization.

Recommended Cultivars

There are many orchardgrass releases available. Orchardgrass cultivars fall into two types: early maturing and late maturing. The most common releases used in Montana and Wyoming are described below.

'Latar' was released in 1957 and is still commonly seeded in pasture and hayland plantings. It has a low lignin (fiber) content and digestibility is very high. It matures 10 to 14 days later than common orchardgrass and is usually in the pre-bloom stage when alfalfa is at the optimum growth stage for cutting hay (less than 10 percent bloom). Therefore a mixture of Latar and alfalfa makes high quality hay. Forage yields for Latar are at least as much per acre as the earlier maturing varieties and forage quality is generally superior.

'Paiute' is a cultivar that produces an abundance of basal leaves and leafy upright stems. Its intended use is for forage production on arid lands. Paiute is considered somewhat more drought tolerant than other varieties of orchardgrass. However, it generally does not perform well in below 15-inch rainfall areas. At very high elevations (over 6,500 feet), it may perform well given slightly less rainfall. Paiute matures too early to be compatible with alfalfa hay production.

'Potomac' is a productive, persistent, rust-resistant cultivar that produces good yields but matures too early to be compatible with alfalfa for hay. When alfalfa is ready to cut, Potomac is too mature to produce good quality hay. When seeded in a monoculture, Potomac often produces very high yields. This variety should be used where early maturity is needed and as a single species hay crop or irrigated pasture.

References

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