



Smooth Bromegrass

Smooth bromegrass (*Bromus inermis* L.) is a leafy, sod-forming perennial grass that is best suited for hay or early spring pasture. It is deep rooted and spreads by underground rhizomes. It matures somewhat later in the spring than orchardgrass and makes less summer growth than orchardgrass. Forage quality of smooth bromegrass compares well with other cool-season grasses, being affected primarily by stage of maturity.

Smooth bromegrass is the most widely used cool-season grass in North America. It is grown extensively in Canada and the north-central United States. Smooth bromegrass survives periods of drought and extremes in temperature (Table 1). It can be grown on a variety of soil types but grows best on well-drained silt-loam or clay-loam soils. It is fairly tolerant of alkalinity and somewhat tolerant of salinity and acidity but will perform best at a soil pH between 6.0 and 7.0.

ADAPTED VARIETIES

Numerous varieties of smooth bromegrass have been evaluated in research studies at Penn State. These varieties differ in date of heading in the spring as well as yield. These newer varieties start growing earlier in the spring and stay green longer than “common” bromegrass. Common bromegrass is not a variety but a bromegrass of uncertain genetic makeup. Yield and heading information for smooth

bromegrass varieties appear in the *Forage Trials Report*, an annual publication available at county offices of Penn State Cooperative Extension.

ESTABLISHMENT

A moist, firm seedbed is required for smooth bromegrass or bromegrass-legume mixtures. Most often planted in spring, smooth bromegrass may also be planted in late summer, when weather conditions usually are more favorable.

Seed may be either drilled or broadcast. Drilling is preferred because it provides a more uniform depth of planting. Plant seed ¼ to ½ inch deep. Long, narrow bromegrass seeds, however, often bridge in conventional seed drills and make planting difficult. Alternate seeding methods may help avoid this problem: (1) mixing bromegrass seed with a small amount of super phosphate and sowing through the fertilizer attachment of the grain drill, or (2) mixing bromegrass with a small amount of oats and sowing through the small grain attachment of your grain drill (only for spring seeding).

Most hopper-type fertilizer spreaders can be calibrated to broadcast smooth bromegrass seed. If seed is broadcast, however, be sure to cover the seed. This can be done by light disking or by following with a drag or harrow.

Smooth bromegrass seeding rate varies with seedbed condition, method of seeding, and quality of seed.

Table 1. Characteristics of perennial cool-season grasses in Pennsylvania.

Grass	Seedling vigor ^a	Tolerance to soil limitations			Persistence	Tolerance to frequent harvest	Relative maturity ^c
		Droughty	Wet	Low pH ^b			
Kentucky bluegrass	M	L	M	M	H	H	Early
Orchardgrass	H	M	M	M	M	H	Early-medium
Perennial ryegrass	H	L	M	M	L	H	Early-medium
Reed canarygrass	L	H	H	H	H	H	Medium-late
Smooth bromegrass	H	H	M	M	H	L	Medium-late
Tall fescue	H	M	M	H	M	H	Medium-late
Timothy	M	L	L	M	H	L	Late

a. L = low, M = moderate, H = high.

b. pH below 6.0.

c. Maturity characteristic refers to relative time of seed head appearance in the spring. This will depend not only on the species but also on the variety.

Table 2. Seeding rates for smooth brome grass and a single legume in mixture.

Species	lbs/A
Smooth brome grass	6-8
With any one of these legumes	
Alfalfa	8-10
Birdsfoot trefoil	6-8
Red clover	6-8
White clover	2-4

Generally, when seeding brome grass alone, rates of 12 to 16 pounds per acre are sufficient. When seeding in mixtures with a legume, seeding rates of 6 to 8 pounds per acre of brome grass are recommended (Table 2).

HARVEST MANAGEMENT

Growth stage is the most important factor in smooth brome grass harvest management. Brome grass is somewhat tolerant of light grazing during the tillering stage of growth. During this initial flush of growth, the growing point is below the ground. Later, when shoots begin to elongate (jointing stage of growth), the growing point may be destroyed by mowing or close grazing.

If the growing point is destroyed at early jointing, regrowth will be slow because new growth will have to come from basal buds not yet developed. When seed heads emerge, it is time to clip pastures or to harvest the forage for hay or silage. This will ensure quality forage and quick regrowth of the new crop. Timely harvest of the spring crop resulted in a 33 percent increase in total season yield over harvesting too early. Smooth brome grass persistence and yield are adversely affected by early harvesting of the spring growth (Table 3). However, delaying the spring harvest beyond early bloom will result in large reductions in forage digestibility and protein content (Table 4).

The aftermath crop similarly produces a growing point that is above ground approximately 5 weeks after the first harvest. If it is necessary to harvest the regrowth during the jointing stage of development, adjust the cutter bar above the growing point (4 inches) to ensure a good third harvest. The quality of the aftermath harvests is only slightly affected by time of harvest.

FERTILITY

Fertility needs at seeding should be determined by soil test. Soil pH between 6.0 and 7.0 is best for smooth brome grass; however, it is adapted to slightly alkaline or acid soils (Table 1). In the absence of a soil test, assuming a

medium-fertility soil, plow down 0-45-135 pounds per acre and apply 20-20-20 pounds per acre at seeding (banded if possible). If brome grass is seeded with a legume, reduce or eliminate nitrogen application at seeding.

Smooth brome grass is very responsive to N fertilization and requires a high level of fertility for maximum production. If you plant smooth brome grass with alfalfa or another legume, restrict N applications to 40 or 50 pounds per acre to limit the effect N has on reducing nitrogen fixation of the legume. If smooth brome grass is grown without a legume, apply 100 to 200 pounds N per acre in split applications of 50 pounds per acre in early spring when the grass becomes green and 50 pounds per acre after each cutting.

SUMMARY

Smooth brome grass is a deep-rooted, sod-forming grass that grows best on fertile, well-drained soils with pH above 6.0. It will not tolerate frequent cutting. Spring harvest should be made before jointing or after the early flower stage of development to ensure maximum smooth brome grass persistence. This restriction on harvesting makes brome grass unsuitable in mixtures with alfalfa that will be harvested at the bud stage. However, mixtures with legumes that will not be harvested before 1/10 bloom are excellent. Smooth brome grass is a good cool-season grass for Pennsylvania conditions, but proper management is essential to obtain adequate yield and persistence.

Table 3. Yield and persistence of perennial cool-season grasses when the first harvest was taken at different stages of grass development and fertilized at two rates of N, averaged over three production years.

Stage at first harvest	N ^a	Dry matter yield				Persistence after three years			
		OG ^b	RC ^b	SB ^b	Tim ^b	OG	RC	SB	Tim
		tons/acre				% groundcover			
Prejoint	High	3.2	3.3	3.0	3.3	54	100	22	32
	Low	2.2	2.1	2.3	2.5	58	100	30	47
Early head	High	3.5	3.5	3.9	3.4	49	100	23	32
	Low	2.0	1.9	2.9	2.4	57	100	30	32
Early bloom	High	3.6	3.7	4.9	3.9	51	100	25	14
	Low	2.4	2.0	3.7	2.8	55	100	35	35
Late bloom	High	3.6	3.8	5.1	4.0	42	100	30	13
	Low	2.5	2.0	4.0	3.6	53	100	38	40
Means of harvest schedules									
Prejoint		2.7	2.6	2.7	2.9	56	100	26	39
Early head		2.8	2.7	3.4	2.8	57	100	27	32
Early bloom		3.0	2.9	4.3	3.3	52	100	30	24
Late bloom		3.0	2.9	4.6	3.4	48	100	34	26
Means of N rates									
	High	3.5	3.6	4.3	3.6	48	100	25	22
	Low	2.3	2.0	3.2	2.7	56	100	33	38

a. High N treatments received 200 to 250 lbs N per acre per year, low N treatment received 100 to 125 pounds N per acre per year.

b. OG = 'Pennlate' orchardgrass, RC = common reed canarygrass, SB = 'Saratoga' smooth bromegrass, Tim = 'Climax' timothy.

Adapted from Northeast Regional Publications 550, 554, 557, and 570. *Management and Productivity of Perennial Grasses in the Northeast*. West Virginia Agric. Exp. Stn.

Table 4. Nutritional value of perennial cool-season grasses at first harvest during spring and summer.

Stage at first harvest ^a	Crude protein				Digestible dry matter			
	OG ^b	RC	SB	Tim	OG	RC	SB	Tim
	%							
Prejoint	28.3	24.5	31.9	32.3	82	79	84	76
Early head	16.8	17.0	18.0	16.1	66	72	72	62
Early bloom	14.7	15.4	14.1	11.3	63	71	67	59
Late bloom	12.5	11.1	8.6	8.8	57	60	54	55

a. Grasses were fertilized with 200 to 250 lbs N the previous year.

b. OG = orchardgrass, RC = reed canarygrass, SB = smooth bromegrass, Tim = timothy.

Adapted from Northeast Regional Publications 550, 554, 557, and 570. *Management and Productivity of Perennial Grasses in the Northeast*. West Virginia Agric. Exp. Stn.

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