Orchardgrass

Orchardgrass (*Dactylis glomerata* L.) is a perennial, cool-season, tall-growing, grass that does not have rhizomes or stolons (bunch-type grass). It starts growth early in spring, develops rapidly, and flowers during May under Pennsylvania conditions. Orchardgrass is more tolerant of shade, drought, and heat than is timothy, perennial ryegrass, or Kentucky bluegrass but also grows well in full sunlight (Table 1).

Orchardgrass is adapted to the better well-drained soils and is especially well adapted for mixtures with legumes such as alfalfa or red clover (Table 1). It will generally persist longer than the other cool-season grasses in frequently cut, properly managed, alfalfa mixtures.

Orchardgrass is a versatile grass and can be used for pasture, hay, green chop, or silage. A high-quality grass, it will provide excellent feed for most classes of livestock.

ADAPTED VARIETIES

Several varieties of orchardgrass have been tested in Pennsylvania variety trials. When seeding an orchardgrass-legume mixture, the two should mature at about the same time. This will enable harvesting of both species at proper developmental stages and improve the potential of harvesting top-quality forage.

ESTABLISHMENT

Orchardgrass is usually easy to establish in either early spring or late summer. Late summer seedings, however, have been most successful in Pennsylvania. There is increased risk of winter injury with summer seedings made after mid-August.

Seed at the rate of 8 to 12 pounds per acre. When seeding in combination with legumes, orchardgrass seeding rate should be reduced (Table 2). Orchardgrass should not be seeded with other grasses because of differences in maturity and palatability.

Table 2. Seeding rates for orchardgrass and a single legume in mixture.

Species	lbs/A
Orchardgrass	2–6
With any one of these legumes	
Alfalfa	8–10
Birdsfoot trefoil	6–8
Red clover	6–8
White clover	2–4

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.

Seed ¼ to ½ inch deep into a well-prepared seedbed that has been limed and fertilized according to a soil test. Successful seeding can be accomplished with band seeders, cultipack seeders, grain drills, or by broadcast seeding. Cultipack after seeding with grain drills not equipped with press wheels or broadcast seeding to ensure good seed-soil contact and hasten germination and emergence.

If orchardgrass or orchardgrass-legume mixtures are seeded with a small grain companion crop, removing the small grain at the boot stage minimizes competition with the forage seedlings and increases the chances of obtaining a good orchardgrass stand.

HARVEST MANAGEMENT

For highest quality and high-yielding hay, orchardgrass should be harvested in spring during boot stage. Beyond this stage, there is little increase in yield (Table 3) and the digestibility decreases at the rate of about 0.5 percent per

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 lb N per acre per year, low N treatment received 100 to 125 lbs 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.

day (Table 4). Aftermath growth can be harvested at 4- to 6-week intervals. Production and cutting frequency are greatly affected by soil moisture, soil temperature, soil fertility, and disease incidence.

Since orchardgrass is a high-quality grass, it can be grazed by most classes of livestock. Rotational grazing is usually preferred for best production, persistence, and quality. Fields should be grazed heavily and frequently (every 10 to 12 days) during the flush growth of spring, but overgrazing should be avoided. Leave a 3 to 4 inch stubble so the grass can recover quickly. Heavy grazing during October can lead to depleted root reserves and increased winter injury.

In a three-year study at Purdue University, animal performance was compared when grazing orchardgrass and tall fescue (Table 5). Both cows and calves gained approximately ½ pound per day more on orchardgrass than on tall fescue. Conception rate of the cows was 18 percentage points higher on the orchardgrass pastures. Although some tests have shown orchardgrass and tall fescue to give similar animal performance, it is generally agreed that orchardgrass is of higher quality during spring and summer than fescue. This is probably associated with the endophyte problem in older varieties of tall fescue. However, fescue is of higher quality in fall, especially after frost.

A ten-year study in Virginia showed liveweight gain per animal to be greater on orchardgrass, but liveweight gain per acre was greater for tall fescue. Palatability, as measured by grazing preference, was higher for orchardgrass than either tall fescue, bromegrass, or bluegrass.

Table 5. Performance of cows and calves grazing orchardgrass and tall fescue during a three-year period.

	Orchardgrass	Tall fescue
Calf performance		
Average daily gain (lbs)	1.76	1.28
Weaning weights (lbs) (205-day adjusted)	429	351
Cow performance		
Average daily gains (lbs)	0.58	0.02
Conception rate (%)	90	72

Adapted from V. L. Lechtenberg et al. 1975. *Indiana Beef-Forage Research Day Report*, Purdue University 1975.

FERTILITY

Maintain soil pH between 6.0 and 7.0 for best results. In the absence of a soil test, assuming a medium-fertility soil and orchardgrass seeded alone, incorporate 0-45-135 pounds per acre prior to seeding and apply 20-20-20 pounds per acre (banded if possible) at seeding. Top dressings with lime, phosphorus (P), and potassium (K) based on soil-test results will be necessary for top production and long stand life.

If soil fertility is low, a large proportion of the total production of orchardgrass occurs in spring, whereas with proper fertility and split applications of nitrogen, aftermath production may contribute from 35 to 65 percent of total production. By comparison, aftermath of timothy with similar management and fertility contributes about 20 percent of the total production.

Orchardgrass is responsive to fertilizer, especially nitrogen (N), and becomes very competitive when adequate nutrients are available. Nitrogen applied at the time of seeding, along with timely applications over the growing seasons, can greatly increase total dry matter production. Annual nitrogen applications of 150 pounds per acre are economical. The nitrogen should be applied in split applications of 50 pounds per acre in early spring when the orchardgrass begins to green up and 50 pounds per acre after each cutting.

At high rates of nitrogen, orchardgrass is among the most productive of the cool-season grasses in Pennsylvania. Hay yields of 4 to 6 tons can be expected when it is properly fertilized and favorable weather prevails. Yields are reduced during periods of drought.

SUMMARY

Orchardgrass is a bunch-type grass which establishes rapidly and is suitable for pasture, hay, or silage. However, because it becomes coarse and less palatable as it matures, it is best suited for pastures. The rapid decline in palatability and quality as orchardgrass matures is the major deterrent to its use. Orchardgrass requires careful management to ensure that it is harvested promptly. Orchardgrass responds well to nitrogen fertilization and is very compatible with legumes in a mixture. It is not as winter hardy or drought tolerant as smooth bromegrass, but it can survive and be highly productive throughout all of Pennsylvania.

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