

Reed Canarygrass

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Reed canarygrass is believed to be native to the temperate regions of Europe, Asia and North America (Ahlgren, 1956, Forage Crops). It has been cultivated and utilized as a forage in the United States since colonial times. Because of its tolerance of wet conditions and its ability to form a dense sod, it has been extensively used in soil conservation projects for stream bank, pod, and waterway stabilization. It is unchallenged in its value to heal and control gullies.

Unfortunately, because of its extensive production of light seed and extensive underground stem system, reed canarygrass spread is sometimes difficult to control and it has been categorized as invasive.

Traits

Adaptable to a diversity of soils and climates

Reed canarygrass tolerates a soil pH range of 4.9 to 8.2. Reed canarygrass is particularly adapted to wet soils. Mature plants have tolerated up to 7 weeks of spring flooding. Reed canarygrass has superior persistence on poorly drained soils, yet its yield and persistence under moisture deficits is equal to or superior to other commonly grown cool season grasses.

Grass	Irrigated	Drought
Reed canarygrass	2.0	0.8
Smooth brome grass	1.4	0.5
Orchardgrass	1.3	0.6
Timothy	0.7	0.4

*Yields from a mid-July harvest averaged for 2 years. Grasses fertilized in spring with 150 lb N/acre.

Table 2. Flooding tolerance (in days of flooding) of perennial forages.	
Crop	Days of flooding
Alfalfa	10-14
Smooth brome grass	24-28
Meadow fescue	24-35
Reed canarygrass	49

Source: Ahlgren. 1956. Forage Crops. McGraw Hill Pub. Co.

Thrives under diverse cutting management

Reed canarygrass is among the most persistent perennial grasses adapted to Minnesota. It has exceptional winterhardiness and maintains yield under cutting strategies designed to produce both biomass through infrequent cutting and high quality forage through frequent cutting.

Suitable for legume mixtures

Grasses like reed canarygrass are mixed with legumes to minimize bloat potential, soil erosion, legume heaving, and weed invasion inherent in legume monocultures and to increase hay-drying rates. Recommended grass composition varies from 20 to 50% depending on use of the forage. We have found that reed canarygrass mixtures with alfalfa and kura clover had the greatest stability over time. Unfortunately, smooth brome grass and timothy often fail to persist when planted in mixture with alfalfa and kura clover and orchardgrass is too competitive. The forage quality of reed canarygrass is equivalent to that of other perennial cool-season grasses. Like those grasses it's quality is greatly influenced by stage of maturity at harvest. Quality declines as maturity increases.

Wastewater application and bioremediation

Reed canarygrass has superior capacity to persist and remove nitrogen when irrigated with municipal and industrial waste effluent. Table 2 shows the results from a wastewater application study in southern Minnesota. Because of its exceptional ability to take up N reed canarygrass has been used for liquid manure disposal. Table 3 shows the results from a liquid manure application study in southern Minnesota. Note that reed canarygrass stands were actually improved by nitrogen fertilization.

Table 3. Forage yield, N uptake, and stands of perennial grasses cut 3 times and treated with municipal wastewater*.

Grass	Forage yield (ton/A)	N uptake (lbs/acre)	Stands** %
Reed canarygrass	5.0	363	46
Orchardgrass	3.6	234	55
Tall fescue	5.1	308	12
Kentucky bluegrass	3.2	222	77
Smooth brome	3.1	225	8
Timothy	3.1	213	6

*Source: Marten et al., 1979. Agron. J. 71:650-658.
 **Stands are after 5 years of cutting and wastewater treatment.

Table 4. Reed canarygrass dry matter yields and final stands in response to manure application*

Manure rate (gal/acre)	Forage yields (ton/acre)	Stands (%)
0	1.82	53
10,000	2.81	64
20,000	3.73	73
30,000	4.08	81
40,000 ⁺	4.86	75

*Source: Schmitt et al., 1999. J. Prod. Agric. 12:239-243
 **Values are an average from 5 site years.
⁺The 40,000 gal/acre rate provided about 920 lb total N/acre

Low alkaloid reed canarygrass

Lack of palatability to livestock is frequently cited as why this agronomically superior species is not more widely grown. Older varieties such as Rise and Vantage, and most native types growing in wetlands, contain significant amounts of indole alkaloids. Alkaloids are bitter,

complex, nitrogen containing compounds that can reduce the performance of grazing animals. Animal performance may be highly negatively correlated with total alkaloid concentration; however, the two types of alkaloids in reed canarygrass have been documented to affect grazing animals somewhat differently. High concentrations of simple gramine alkaloids reduce palatability. The more complex tryptamine-carboline alkaloids cause diarrhea as well as reduce palatability. The threshold indole alkaloid level beyond which sheep will consistently reject reed canarygrass in cafeteria offerings is about 0.4 to 0.6% dry weight. Indole alkaloid concentrations at or above 0.2% dry weight have been shown to reduce gain in grazing lambs. It should be noted that sheep are more sensitive to alkaloids than cattle and will likely tolerate high concentrations in the forage.

Varieties of reed canarygrass

Most native types of reed canarygrass growing in wetlands as well as the traditional varieties such as 'Rise' have high concentrations of alkaloids. 'Venture' and 'Palaton' were the first commercial varieties to be developed (1985) with enhanced palatability due to low gramine, and no tryptamine and carboline alkaloids concentrations. Another low alkaloid variety, 'Rival' also was released in Canada about the same time. In the summer of 2002, we evaluated the alkaloid concentration of several reed canarygrass varieties. We were especially interested in alkaloid levels in Marathon and Chiefton, the two newest low alkaloid varieties. The total alkaloid concentration of the leaf blades ranged from 0.19 to 0.26 (Table 2) and consisted only of gramine alkaloids. Vantage, the oldest entry in the trial, contained the highest alkaloid concentrations. While these levels in leaf blades exceeded the threshold level for affecting lamb performance, it should be noted that we sampled only leaf blades that usually contain the highest alkaloid concentrations. Grazing animals will likely consume portions of the stem, thereby, diluting the alkaloid levels by ¼ to ½ depending on the amount of stem materials consumed.

Table 5. Total alkaloid concentration in leaves of reed canarygrass varieties sample at a vegetative stage (~12 inches tall).	
Variety	Alkaloid %
Venture	0.19
Palaton	0.20
Marathon	0.23
Chiefton	0.24
Rival	0.24
Vantage	0.26