

FORAGE SPECIES DESCRIPTION : LEGUMES

CROP (Seeds Per Kilogram)	ADAPTATION					
	Characteristics of the Crop and Area of Adaptation	Longevity Under Average BC Conditions	Flood Tolerance (when dormant)	Salinity Tolerance	Drought Tolerance	Winter Hardiness
Alfalfa (484,000)	This crop has a tap root, good crown development and erect stems. - Wide range of climate; well drained soils.	Irrigated 5-7 years Dryland –long life	5-10 days	Fair	Good	Variable with variety poor to good
Sweet Clover (572,000)	First season growth consists of a central, much branched stem. Crown buds produce rapidly growing, tall, coarse stems in second year. Strong tap roots. - Well drained soils	2 years	14 days	Fair	Good	Good
Birdsfoot Trefoil (713,000 – 1,200,000)	Strong deep tap root system with many side branches. Can regenerate crowns from root portions. Fine stemmed but not as erect or tall as alfalfa. - Cool, moist areas; tolerates poor drainage.	Long 10 ⁺	14 days	Fair	Fair	Good
Red Clover (550,000)	Short tap roots with side branches. Good stands persist for one to three years depending on variety, soil moisture and temperature. Humid, moderate temperatures; moist soils.	1-3 years	7-14 days	Poor	Poor	Good
Alsike (1,540,000)	A profusely tillering prostrate plant with indeterminate growth habit. - Low lying, moist soils.	2-4 years	14 days	Poor	Poor	Good
Cicer Milkvetch	Vigorous, deep root system; very long lived; recumbent growth habit.	Long 10 ⁺	7-14 days	Fair	Medium	Good
Sainfoin (66,000)	Long lived on dryland; Shorter life under irrigation. Short tap roots with many side branches. Top growth to 1m.	Dryland long 10 ⁺ Irrigated – 3-5 years	Up to 7 days	Low	Good	Good
White/Ladino Clover (1,760,000)	Ladino – taller and higher yielding than common white. Dutch Clover Ladino is less winter hardy and less tolerant of close grazing than white Dutch. Shallow rooted perennials that spread by stolons.	Short 3 ⁺ (reseeds naturally)	10-14 days	Low	Poor to Fair	

PRODUCTION			
pH Range For Optimum Growth	Period of Major Production	Positive Features	Negative Features
6.5 – 8.0	Spring to Fall	Easily established on most soils with good drainage. High yields of good quality forage. Rapid re-growth following grazing or clipping.	Bloat hazard. Requires good drainage. Poor persistence when grazed or clipped frequently.
6.5 – 8.0	Spring of Second Year	Grows under a wide range of soil and climatic conditions. Excellent for soil and drainage improvement. Low coumarin varieties available.	Seedling stands thinned or destroyed by sweet clover weevils. Low palatability unless harvested early. Coumarin content of some varieties can cause feeding problems.
5.5 – 7.5	Spring to Fall	Long-lived. Will grow on wide range of soil conditions. Reseed itself when conditions are favorable. Feed value similar to alfalfa. No bloat hazard.	Poor seedling vigor; poor competitor in weedy stands. Slow to come into full production. Lodges easily. Slow recovery after grazing or clipping.
6.5 – 7.5	Spring	Easy to establish. Tolerates soils wetter and more acidic than alfalfa.	Bloat hazard. Short life span due to a number of crown and root diseases.
5.5 – 7.5	Spring	Tolerant to poor drainage and acid soils.	Bloat hazard. Short life span. Low aftermath yield. May be toxic to horses.
6.0 – 8.0	Late Spring to Fall	Non bloating legume. Good late summer growth. Tolerant of grazing.	Hard seed is common; requires scarification. Slow to establish; slow to grow in spring.
6.5 – 8.5	Spring	Non bloating legume. Long life under dryland conditions. Maintains quality as plant matures.	Less productive than alfalfa. Not competitive in mixtures. Slow to establish.
6.0 – 7.5		Tolerant of heavy grazing. Palatable and nutritious. Very useful in pasture mixes under irrigation.	Lower yielding than other legumes. Can cause bloat.

FORAGE SPECIES DESCRIPTION : GRASSES

CROP (Seeds Per Kilogram)	ADAPTATION						
	Plant Type	Plant Height cm (in)	Longevity Under Average Conditions	Winter Hardiness	Flooding Tolerance	Drought Tolerance	Salinity Tolerance
Kentucky Bluegrass (4,840,000)	Creeping, sod-forming	30-75 (12-30) Basal leaves	Long	Excellent	Medium	Good when plant is dormant	Poor
Meadow Bromegrass (176,000)	Bunch, some spreading	60-120 (24-48)	Long	Excellent	Low	Good	Fair
Smooth Bromegrass (297,000)	Creeping, sod-forming	60-120 (24-48)	Long	Excellent	Medium	Good when plant is dormant	Fair
Creeping Red Fescue (1,353,000)	Creeping	60-120 (24-48) Basal leaves	Long	Excellent	Medium	Fair to good	Poor
Meadow Fescue (506,000)	Bunch	35-75 (14-30) Basal leaves	Medium	Good	High	Good	Fair
Orchard-grass (1,430,000)	Bunch	60-120 (24-48)	Medium	Fair-Good (unless protected)	Low	Good	Poor
Reed Canary-grass (1,166,000)	Creeping (short rhizomes)	60-240 (24-96)	Long	Good except where exposed	High	Fair	Fair
Tall Fescue (500,533)	Bunch	105-150 (40-60)	Medium	Fair-Good	Medium – Good	Good	Good

Preferred Climate and Soil Type	PRODUCTION		
	Period of Major Production	Positive Features	Negative Features
Cool, humid. 500-1250 mm (20-50 in) precipitation. Will grow on almost any well-drained soil.	Spring Fall	Tolerates close and frequent defoliation. Tolerates wet conditions for short periods of time. Can be regenerated from rhizomes. Useful in erosion control.	Slow to establish. High moisture requirements; dormant in hot, dry weather.
Well drained soils.	Spring Fall	Winter hardy. Better re-growth than smooth brome. Responds well to irrigation and fertilizer. Palatable to livestock.	Slow to establish. Large, light seeds difficult to sow (bridging). Sensitive to spring flooding.
Moist, well drained soils.	Spring	Winter-hardy; drought and heat tolerant. Grows on diversity of soil types. Palatable even at mature growth stages.	Seed light and difficult to sow (bridging). Slow to establish. Becomes sod-bound in absence of nitrogen. Weakened by heavy grazing. Susceptible to winter crown and root rot.
Cool, humid areas. Will grow in wide range of soil types.	Spring Fall	Vigorous seedling. Tolerates low fertility and close grazing. Tolerates areas too dry for timothy. Starts growth fairly early in spring. Grows vigorously late summer to freeze-up.	Palatability fair. Vulnerable to crown and root rots and to snow mold.
Soils with ample moisture and good drainage.	Spring through Fall	Establishes rapidly on wide range of soils. Productive through out entire growing season.	Does not persist under continuous heavy grazing. Susceptible to leaf rusts. Less palatable than most grasses.
Warm, moist areas with over 500 mm (20 in) precipitation. Good drainage.	Spring through Fall	Rapid establishment. Rapid re-growth following harvest. Shade tolerant. Compatible with alfalfa.	Only moderately winter hardy. Requires high nitrogen inputs for high production. Coarse and unpalatable at maturity.
Moist, cool climate; poorly drained areas subject to temporary flooding.	Spring through Summer	Grows well in wet areas and can withstand considerable flooding. Remains productive throughout season. Excellent grass for waterways and areas subject to water erosion.	Seed difficult to sow. Slow to establish a sod. Palatability declines rapidly with advance in maturity. Alkaloids in forage associated with decrease in animal performance.
Widely adaptable	Spring through Fall	High yield, good fall production, maintains quality into winter, good for stockpile grazing	Fairly slow to establish, lower palatability than orchard grass when grown in mixtures. Must use only endophyte free seeds.

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	Plant Type	Plant Height cm (in)	Longevity Under Average Conditions	Winter Hardiness	Flooding Tolerance	Drought Tolerance	Salinity Tolerance
Timothy (2,700,000)	Bunch	50-100 (20-40)	Medium	Good	High	Poor	Poor
Crested Wheatgrass Diploid (Fairway 704,000) Tetraploid (Nordan 418,000)	Bunch	50-90 (20-36)	Long	Excellent	Low	Excellent (Fairway type goes dormant faster than Nordan)	Fair
Slender Wheatgrass (352,000)	Bunch	60-120 (24-48)	Short (4-5 Years)	Excellent	High	Good	Good
Inermediate Wheatgrass and Pubescent Wheatgrass (194,000)	Creeping (short rhizomes)	90-150 (36-60)	Medium (about 6 years)	Excellent	Medium	Good	Poor
Tall Wheatgrass (174,000) (Tall Fescue)	Bunch (short root-stocks)	90-180 (36-72)	Long	Excellent	High	Poor	Good
Russian Wild Ryegrass (385,000)	Bunch basal leaves 15-45 cm (6-18 in)	50-90 (20-36)	Long	Excellent	Low	Good	Fair
Perennial Ryegrass (500,000)	Bunch	30-60 (12-24)	Short	Fair	Low	Poor	Low

Preferred Climate and Soil Type	PRODUCTION		
	Period of Major Production	Positive Features	Negative Features
Cool, moist areas with good drainage.	Spring through Summer.	Seed plentiful and low priced. Stand establishment is rapid. Offers little competition to the legume in mixtures.	Susceptible to heat and low moisture conditions. Low palatability and feed value at maturity. Weakened by heavy grazing or frequent cutting.
Light soils and areas deficient in moisture. Can be grown on most soils if they do not have high water table.	Spring and Fall	Easily established on wide range of soils. Withstands close grazing and tramping. Palatable in early spring.	Does not tolerate cool, wet soils, (especially tetraploid). Hay quality deteriorates rapidly after heading. Slow re-growth after hay harvest.
Adapted to wide range of soils but prefers sandy loams.	Spring and Early Summer	Good seedling vigor; easily established. Shade tolerant. Forage cures well on stem. High salinity tolerance.	Less competitive and persistent than other wheatgrasses. Not resistant to close or heavy grazing.
Well drained fertile soils with ample moisture.	Spring, Summer and Fall	Easily seeded. Begins growth in early spring. In moister areas out yeilds crested wheatgrass and brome. Good hay grass in association with alfalfa.	Less drought tolerant and winter-hardy than crested wheatgrass. Does not tolerate salinity. Does not persist in areas with poor drainage.
Adapted to saline and imperfectly drained alkali soils. Prefers soils with high water table. Survives flooding for 2 months in spring. Needs 375 mm (15 in) minimum precipitation.		Very tolerant of saline soils. In early heading stage has high protein and TDN ratings.	Slow to establish – poor germination, poor vigor and poor competitive ability. Not as palatable as other wheatgrasses.
Can be grown on a wide range of soil types but is most productive on fertile loams.	Spring through Fall	Early, excellent dryland crop. Roots draw on moisture up to 1.5 m (approx. 5'). Very tolerant of grazing; re-grows quickly. Palatable and nutritious in mature stage. Good salinity tolerance.	Poor seedling vigor, therefore poor competitor in establishment year.
Heavy moist soils. Moderate temperatures.	Spring, Summer and Fall	Quick establishment, rapid re-growth. Very palatable, high quality. Good fall growth.	Poor winter hardiness. Predominantly basal leaves, low growing, makes it hard to harvest mechanically. Low tolerance to high temperatures.

FORAGE SPECIES DESCRIPTION : ANNUAL FORAGES

CROP	ADAPTATION			
	Seeds Per Kilogram (Pounds)	Plant Type	Plant Height cm (in)	Drought Tolerance
Annual Ryegrass - Westerwolds type (not recommended) has become a weed problem	Diploid – 500,000 (227,000) Tetraploid – 200,000 (90,000)	Bunch	50-60 (2-24)	Poor
Annual Ryegrass - Italian Type	Diploid – 500,500 (227,000) Tetraploid – 200,000 (90,000)	Bunch	40-50 (16-20)	Poor
Barley	30,900 (14,000)	Bunch	75-100 (30-40)	Good
Oats	28,700 (13,000)	Bunch	75-150 (30-60)	Fair
Winter Wheat	33,100 (15,000)	Bunch	75-100 (30-40)	Good
Fall Rye	39,700 (18,000)	Bunch	75-150 (30-60)	Good
Peas	6,600 (3,000)	Recumbent Vines	Vines to 2m	Fair
Hairy Vetch (Winter Annual)	44,100 (20,000)	Vines	Vines to 150 cm	Fair
Fababeans	6,600 (3,000)	Erect Growth	100-180 (40-72)	Poor
Sorghum/Sudangrass	60,000-120,000 (27,000-54,000)	Tall Bunch Type	2-3 m	Good

	PRODUCTION		
Preferred Climate and Soil Type	Period of Major Production	Positive Features	Negative Features
Cool, moist areas. Medium to heavy soils.	Late Summer and Fall	High quality, palatable forage. Excellent fall growth. Erect growth.	Poor heat and drought tolerance. More stems and lower digestibility than Italian type ryegrasses.
Cool, moist areas. Medium to heavy soils.	Late Summer and Fall	Leafy, very high quality forage.	Poor heat and drought tolerance. Low growth habit makes mechanical harvesting less efficient.
Adaptable to wide range of well drained soils. Tolerant of salinity and high pH.	Mid-Summer and Fall (if double cropped)	High yield, high quality forage for silage. Well adapted to intensive management and double cropping.	Stiff awns (beards) create some problems when harvested as hay.
Requires more moisture than barley, will tolerate poorer drainage than barley.	Mid-Late Summer	Good yield, easy to grow for hay or silage.	Lower quality than barley. Not as useful in double crop systems.
Adapted to wide range of soils. Good heat and drought tolerance.	Depends when planted. Spring use if Fall planted. Summer and Fall use if Spring planted.	Palatable, good quality spring pasture when planted previous Fall. More drought and heat tolerant than Annual Ryegrass	When planted in Spring, yield is low; but can be useful for Fall pasture.
Adapted to wide range of soils. Good heat and drought tolerance.	Same as Winter Wheat.	Good hardiness when used as winter annual. Makes good Spring pasture.	Feed quality declines rapidly as plant matures.
Cool, moist climate and medium to heavy soils.	Late Summer.	Good quality forage.	Twining growth habit may be difficult to harvest. Does not add significantly to yield. Subject to many fungal diseases.
Broad range of adaptability.	Mid-Summer to Fall.	High quality forage.	Will cause bloat; not hardy as a winter annual in this area. Should be spring planted.
Medium to heavy soils; cool moist growing conditions.	Late Summer.	High quality forage.	Poor competitor with weeds; only fair heat tolerance.
Warm, light soils, high temperatures. Does poorly under cool temperature.	Mid-Summer to Fall.	Good drought tolerance, high yield. Newer varieties offer good forage quality.	Forage quality only fair with older varieties; may contain levels of prussic acid that could be toxic.