Forage Adaptation

Seedbed Preparation

Increasingly, forage growers are successfully establishing forage stands without tillage.

Benefits of zero-tillage forage establishment are:
- lower costs and labour
- better seed bed moisture conservation
- emerging crop is protected by standing stubble from drying-out and sandblasting.

If seeding into an existing forage stand:
- apply one litre per acre glyphosate to reduce competition
- apply fertilizer according to soil test recommendations

If conventional tillage practices are being used, prepare a fine, firm, shallow seed bed.

Seeding

Seed shallow (1/4 to 1 inch) into a firm seed bed. Seed at 1/4 inch for small-seeded forages, such as timothy, on heavy soils. Seed up to one inch for larger seeded forages such as intermediate wheatgrass, or alfalfa on lighter soils.

Spring Seeding

The best time to seed forages is in the early spring, as soon as field conditions permit. The cool, moist conditions of early spring are most favourable for germination and growth of both grasses and legumes. The moist conditions also allow a shallow seeding depth, which is very important for quick establishment of the forage crop.

Summer Seeding

If there is adequate moisture, forages can be seeded from late July to mid-August. During this period, grasses experience a higher rate of success. Legumes require a longer growing period to ensure winter survival, therefore, summer seeding is not recommended.

Dormant Fall Seeding

Use dormant seeding in problem areas that are not suitable for conventional seeding in the spring and summer, (e.g. areas prone to ponding). Dormant seeding can be attempted in either late fall or early spring when the soil temperatures approach the freezing point. The seed will germinate in the spring when the growing conditions are close to ideal. If seeding in the fall, a warm moist fall or early snowfall can raise the soil temperatures sufficiently to cause the seeds to germinate but they will die over the winter.

Cover Crops

Cover crops compete with the forage crop for light, moisture and nutrients, which reduces winter survival and yield the following year. Cover crops are often used to reduce weed competition, sand-blasting and desiccation. Reduce cover crop seeding rate and nitrogen fertilizer rates by half, especially if establishing legume forages, and harvest the cover crop early as green feed to reduce competition. It is important to bale the green feed promptly to eliminate seedling death under the swath.

Legumes

Forage	Use	Longevity	Winter Hardiness	Drought Tolerance	Flooding Tolerance	Salinity Tolerance	Alkalinity Tolerance	Acidity Tolerance	Preferred Climate and Growing Conditions	Growth Period	Positive Features	Negative Features	Plant/Root Type(s)
Alfalfa	Hay & Pasture	Long	Good	Good	Low	Low to Moderate	Moderate to High	Low	Widely adapted to most Manitoba soils but will not tolerate areas that have periodic flooding.	Spring - Fall	Easy to establish. High yields, rapid regrowth. Highest nutrition of all forages.	Bloat hazard. Needs good drainage.	Tap, Branch, Rhizomatous, Creeping
Alsike Clover	Hay & Pasture	Short	Fair	Poor	Moderate	Low	Low to Moderate	Moderate	Prefers low-lying moist areas.	Spring	Easy to establish. Tolerant to poor drainage and acidic soils.	Bloat hazard. Short life span and low yield.	Branched
Birdsfoot Trefoil	Pasture	Long	Good	Moderate	High	Low to Moderate	Moderate	Moderate to High	Prefers moist areas.	Spring - Fall	Non bloating - reseeds itself. Feed value similar to alfalfa.	Poor seedling vigor. Poor competitor and low yield. Low growth habit	Tap Rooted with Branches
Cicer Milkvetch	Pasture	Long	Good	Moderate to High	Low	Moderate	Moderate	Moderate	Widely adapted but exhibits its creeping habit best on more coarse textured soils.	Late Spring - Fall	Non bloating. Hardier than alfalfa. Very aggressive once established.	Slow to establish. Hard seeds. Slow regrowth after grazing.	Creeping Rooted
Kura Clover	Pasture	Long	Good	Moderate	Moderate	Unknown	Unknown	Moderate	Tolerates low fertility and soil acidity, wet soils and some flooding.	Spring - Fall	Good grazing resistance. Deep root system. Rapid regrowth. Does well in conditions not optimal for alfalfa.	Very slow to establish. Bloat hazard. Low growth habit. Three years to establish.	Rhizomatous, Creeping Roots
Red Clover	Hay & Pasture	Short 2-3 years	Poor	Low	High	Low	Moderate	Moderate	Best suited to humid areas with moderate temperatures.	Spring	Easy to establish. Tolerates wetter and more acidic soils than alfalfa.	Slow to cure when used for hay. Causes bloat.	Tap Rooted with Side Branches
Sainfoin	Pasture	Long	Fair	High	Low	Low	High	Low	Best on brown and dark brown soil areas. Yields poorly in very dry areas. Does well on thin gravelly soils.	Spring - Summer	Non bloating. More drought and cold tolerant than alfalfa.	Poor regrowth. Slow to establish.	Tap Rooted
Sweet Clover	Hay & Silage	2 years	Fair	Moderate to High	Low	Moderate	Moderate	Low	Especially productive on well-drained fertile soils.	Spring of second year	Widely adapted. Good for soil and drainage improvement.	Low palatability unless harvested early. Self seeds. May contain coumarin.	Tap Rooted
White Clover	Pasture	Short to long	Good	Poor	Low to Moderate	Low	Low	Moderate	Prefers well drained silt loams to clay soils that have a constant supply of moisture	Spring - Fall	Will reseed. Resistant to grazing with good regrowth. Excellent quality, especially during mid-summer heat.	Low producing. Bloat hazard. Shallow root system.	Rhizomatous

Tame Grasses

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Altai Wild Ryegrass	Pasture	Long	Excellent	High	Low	Very High	Moderate to High	Low to Moderate	Loam and clay soils best - grows on wide range of soils. Doesn't appear to be well adapted to Manitoba conditions.	Early Spring - Mid Summer	Retains nutritional value late into fall/winter. Suitable for extended grazing season. Salt tolerant.	Slow to establish, poor competitor. Coarse textured grass.	Bunch Grass
Annual Ryegrass (Italian)	Hay & Pasture	Annual	Poor	Low	High	Low	Moderate	Moderate	Produces best on soils of medium to high fertility and grows best with adequate moisture.	Spring - Fall	Easy to establish. Very palatable. Good silage. Good companion crop. Excellent fall growth.	Doesn't withstand dry or hot weather. Slow to cure when used for hay.	Bunch Grass
Creeping Foxtail	Pasture	Long	Good	Low	High	Moderate	Moderate	Moderate	Adapted to areas where reed canarygrass grows well and soil moisture is continually available.	Early Spring - Fall	Spreads rapidly once it is established. Suitable for erosion control.	Light, fluffy seed is hard to sow. Slow establishment. Poor competitor during first six weeks.	Sod Forming
Creeping Red Fescue	Pasture & Lawn	Long	Excellent	Moderate	Moderate	Low	Moderate	Moderate	Does best in high rainfall areas. Will grow in wide range of soil types.	Spring - Fall	Tolerates close grazing. Grows well late summer to freeze up and retains quality.	High moisture requirement. Vulnerable to crown and root rots and snow mold.	Sod Forming
Crested Wheatgrass	Pasture & Hay	Long	Excellent	Moderate to High	Low	Low to Moderate	Moderate to High	Low	Adapted to dry areas with good soils but will also establish on lighter soils.	Early Spring	Easy to grow. Excellent for spring pasture. Withstands close grazing and trampling.	Does not tolerate cool, wet soils. Poor quality and palatability after heading out.	Bunch Grass
Dahurian Wild Ryegrass	Pasture	Short	Good	Moderate	Low	High	Moderate	Low	Adapted to all soil zones.	Spring - Fall	Highly competitive and quick to establish.	Short lived. Not very palatable, especially when mature. Shallow rooted.	Bunch Grass
Intermediate Wheatgrass	Hay & Pasture	Short to Medium	Good	Moderate to High	Low	Low	High	Low	A wide range of soils that are well drained with ample moisture.	Late Spring - Mid Summer	Easy to establish. Good hay grass with alfalfa. Out yields Crested WG & Smooth Bromegrass.	Less winter hardy and drought tolerant than Crested Wheatgrass.	Sod Forming
Kentucky Blue Grass	Pasture & Lawn	Long	Excellent	Moderate	Moderate	Low	Low	Low	Prefers cool, humid conditions. Grows on most soils.	Spring - Fall	Tolerates close and frequent defoliation. Useful in erosion control.	Goes dormant in hot, dry weather. Slow to establish. High moisture required. Lower yield.	Sod Forming
Meadow Bromegrass	Hay & Pasture	Long	Good	High	Low	Low	Moderate	Moderate	Grows well on most soils where Smooth Bromegrass does well.	Early Spring - Late Summer	Very palatable. Good regrowth after grazing or cutting. Less aggressive than Smooth Brome grass.	Mainly a pasture grass. Difficult to put up as hay when in pure stand.	Bunch Grass

Tame Grasses

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Meadow Fescue	Pasture	Short to Medium	Good	Moderate	High	Low to Moderate	Low	Moderate	Prefers soil with good moisture and good drainage.	Early Spring - Late Fall	Best for pasture. Good fall pasture - stays green late in fall.	Susceptible to heavy grazing. Slow regrowth. Susceptible to leaf rust. Low yielding.	Bunch Grass
Meadow Foxtail	Pasture	Long	Good	Low	High	Low	Moderate	High	Prefers cool moist conditions. High water table.	Early Spring - Fall	Earliest grass to grow in spring. Very palatable when young. Seeds fall off and reseeds self.	Light, fluffy seed. Susceptible to drought. Seed needs to be coated for seeding.	Bunch Grass
Orchard grass	Hay & Pasture	Short	Fair	Moderate	Low to Moderate	Low	Low	Moderate	Prefers moist conditions. Sandy soils are too dry for good growth unless in high rainfall area.	Spring - Fall	Easy to establish. Very palatable. Fast regrowth. Makes good hay with alfalfa.	Needs high nitrogen for good yield. Moderately winter hardy. Subject to overgrazing.	Bunch Grass
Perennial Ryegrass	Hay & Pasture	Short 2-3 years	Poor	Low	Low	Low	Moderate	Moderate	Needs high precipitation and fertility for high yields. Adapted to wide range of soils.	Spring - Fall	Good seedling vigor, rapid development, high yield and quality. Can be grazed within two months after seeding. Can reseed itself.	High nitrogen for high production. Needs lots of moisture but will not tolerate flooding. Prone to winter kill.	Bunch Grass
Pubescent Wheatgrass	Hay & Pasture	Medium	Good	Moderate to High	Low	Low to Moderate	Moderate	Low	Widely adaptable to precipitation, temperature, elevation and low fertility soil.	Early Spring - Mid Summer	Stays green into the summer months. Hardier than Intermediate Wheatgrass.	Strong creeping roots get sod bound and result in unproductive stand after a few years.	Sod Forming
Russian Wild Ryegrass	Pasture	Long	Excellent	Very High	Low	Very High	High	Moderate	Can be grown on a wide range of soils. Most productive on fertile loams.	Early Spring - Mid Summer	Salt tolerant, early growth and good for winter grazing.	Poor seedling vigor, slow to establish.	Bunch Grass
Smooth Bromegrass	Hay & Pasture	Long	Excellent	Moderate	Moderate	Low to Moderate	Moderate	Moderate	Well adapted to all soils in Manitoba. Most common grass in Manitoba's roadsides & ditches.	Mid Spring - Mid Summer	Winter hardy. Good yield. Palatable even at mature growth stage.	Seed is long, light and difficult to sow (bridging). Becomes sod bound. Slow regrowth.	Sod Forming
Tall Fescue	Pasture	Medium	Good	Moderate	Moderate to High	High	High	Very High	Adapted to a variety of soils. Does well on wet, poorly drained soils.	Late Spring - Fall	Easy to establish. Good regrowth. Drought resistant once established. Stands up well in winter - suitable for extended. suitable for extended grazing.	Slow to cure when used for hay. Starts growing later than many other grasses in spring. Yields poorly under drought conditions.	Bunch Grass
Tall Wheatgrass	Hay & Pasture	Medium	Excellent	Low	High	High	Low to Moderate	Low to Moderate	Adapted to saline and imperfectly drained alkali soils.	Late Spring - Mid Summer	Salt tolerant. High nutrition before heading stage.	Slow to establish. Poor vigor and competitive ability. Coarse and unpalatable when mature.	Bunch Grass
Timothy	Hay & Pasture	Medium	Good	Low	High	Low	Low	High	Adapted to cool, moist areas with good drainage.	Spring - Summer	Low seed costs. Easily established. Excellent hay for horses. Goes well with alfalfa mixture. Suitable for hay export market.	Susceptible to heat and low moisture conditions. Poor palatability at maturity. Subject to over-grazing.	Bunch Grass

Native Grasses*

Forage	Use	Longevity	Winter Hardiness	Drought Tolerance	Flooding Tolerance	Salinity Tolerance	Alkalinity Tolerance	Acidity Tolerance	Preferred Climate and Growing Conditions	Growth Period	Positive Features	Negative Features	Plant/Root Type(s)
Awned Wheatgrass	Hay & Pasture	Medium	Good	Moderate	Moderate	Low to Moderate	Low	Low to Moderate	Prefers moderately sandy to loam soils with good moisture and drainage. Found in moist flats, meadows and low growing bushes.	Spring - Fall	Highly nutritious before heading. Moderate fertility requirements.	Awns on seedhead can be an irritant when fed to livestock. Sensitive to over grazing.	Bunch Grass
Big Bluestem	Pasture	Long	Good	Low to Moderate	Moderate	Low to Moderate	Low to Moderate	Low	Grows under a wide range of conditions.	Early Summer - Fall (Warm Season)	Good mid-summer growth as cool season grasses go dormant. Highly nutritious when vegetative.	Light, fluffy seed. Becomes unpalatable in the fall.	Weakly Sod Forming
Green Needlegrass	Pasture	Long	Good	High	Moderate	Low to Moderate	Low to Moderate	Low	Performs best on medium to heavy textured soils. Prefers moist sites with good drainage.	Late Spring - Mid Summer	Palatable and nutritious. Tolerant to drought and grasshopper damage.	Seed has high level of dormancy. Easily overgrazed.	Bunch Grass
Little Bluestem	Pasture	Long	Good	High	Low	Moderate	Low to Moderate	Low	Sandy, gravelly soil with shallow water table or where snow accumulates. Common on prairie upland.	Late Spring - Fall (Warm Season)	Highly nutritious and palatable when grazed at early stage. Deep rooted.	Light, fluffy seed. Unpalatable when mature. Prone to becoming wolf plants.	Bunch Grass
Northern Wheatgrass	Pasture	Long	Good	Very High	Moderate	Moderate	Moderate	Low to Moderate	Prefers medium to coarse textured soil.	Mid Spring - Mid Summer	Easy to establish. Produces good ground cover. Extensive root system. Suitable for erosion control.	Tends to get sod bound. Nutritious, but wiry and unpalatable in the fall.	Sod Forming
Prairie Cord Grass	Hay & Riparian	Long	Good	Low to Moderate	High	Low to Moderate	Low to Moderate	Low	Wide range of soils (sand to clay) - does best on seasonally dry areas -marsh edges, wet meadows, drainageways.	Late Spring - Fall (Warm Season)	Excellent flooding tolerance. Moderate fertility requirements.	Poor palatability and feed value after spring. Less drought tolerant than big bluestem. Intolerant of prolonged flooding. Not competative - avoid multiple harvests.	Sod Forming
Reed Canarygrass	Hay & Pasture	Long	Good	Moderate	Very High	Low	Moderate	Moderate	Moist cool climate. Poorly drained areas subject to temporary flooding.	Spring - Summer	Grows well in wet area. Withstands flooding for up to 2 months. Grows tall, good yield.	Slow to establish. Nutrition and palatability low when mature. May contain alkaloids.	Sod Forming
Side Oats Grama	Hay & Pasture	Long	Good	Moderate to High	Low	Low to Moderate	Low to Moderate	Low	Adapated to a range of soils. Performs best on fine textured soils. Found on rocky ridges, open grasslands, and hillsides.	Spring - Fall (Warm Season)	Vigorous seedlings. Very palatable and nutritious all season. Cures well on stem. Good for winter grazing. Low to moderate fertility required.	Less palatable than blue grama. Sensitive to overgrazing. Best not graze until second growing season.	Bunch Grass
Slender Wheatgrass	Hay & Pasture	Short 3-5 Years	Good	Moderate	Moderate	High	High	Low to Moderate	Adapted to wide range of soils but prefers sandy loams.	Mid Spring - Mid Summer	Good seedling vigor and fast establishment. High salinity tolerance. Cures well on stem.	Less competitive and persistent than other wheatgrasses. Easily overgrazed.	Bunch Grass
Switchgrass	Pasture	Medium	Fair	Low	Moderate	Moderate	Moderate	Low	Grows best on loams and sandy loams. Potential for good summer pasture with sufficient moisture.	Late Spring - Fall (Warm Season)	Can be used for summer pasture when cool season grasses go dormant.	Slow establishment. Shouldn't be harvested the first year. Unpalatable after maturity.	Bunch Grass
Western Wheatgrass	Hay & Pasture	Long	Excellent	High	Moderate to High	High	High	Low	Widely adapted – tolerates periodic flooding. Prefers moderately alkaline heavy soil.	Early Spring - Fall	Salt tolerant, long-lived. Nutritious, productive and increaser under moderate grazing. Good for erosion control.	Slow to establish. Sensitive to overgrazing.	Sod Forming

* These grasses are indigenous to North America. Available varieties have been improved through plant breeding programs.

For more information contact your local Forage and Pasture Specialist:

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Tips

- Always buy good quality, clean seed.
- Soil test and plan for weed control, especially during establishment year.
- Choose forages that suit your soil and climate conditions.
- Choose forages that meet the needs of your total forage system.
- Be patient during establishment year, forages are slow to start.

COVERING NEW GROUND
MANITOBA AGRICULTURAL SUSTAINABILITY INITIAITVE

Manitoba