

forage selection guide

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How to use this guide

This pamphlet provides a brief overview of some common perennial tame forage species and their suitability within the Bulkley-Nechako & Fraser-Fort George (BNFFG) regions. This guide should be used in conjunction with input from local professionals, new forage research as it becomes available, other technical resources, and on-site knowledge of soil and landscape characteristics. The following points should be considered when selecting forage species and blends:

- Get a comprehensive soil test to understand soil nutrient, salinity, and pH conditions
- Take note of your field history, including:
 - How long does spring flooding last?
 - Are there low spots prone to flooding during the growing season?
 - Was alfalfa grown immediately prior to a planned re-planting with alfalfa? If so, a one-to-two-year break will be necessary to avoid issues with allelopathy.
 - Are there potential herbicide or pesticide residues which could interfere with the new forage crop?
 - Is there any history of soil borne diseases such as verticillium wilt or other fungal, bacterial, or viral pathogens that the plants may need resistance to?
- Consider the intended use (hay, pasture, or both) and whether a simple or more complex forage mixture is suitable.
- What is the desired time of use (spring grazing, summer hay, fall grazing, etc.)? Consider if all the species should mature simultaneously (ideal for haying) or if staggered maturity is desirable (possibly for grazing throughout the season).
- Will plant regrowth and recovery needs fit with the intended harvest pattern (such as haying or grazing frequency) or are some adjustments in management needed to maintain certain forages within the stand? This could be as simple as allowing key forages to go to seed every two-to-three years to ensure re-seeding and stand persistence.
- If using a forage mix, will the individual plants grow well with each other? For example: an aggressively creeping rooted species such as smooth brome may outcompete tap rooted species like sainfoin or alfalfa.
- Notice the longevity of forages you are considering and whether they align with your long-term forage stand management goals.

rating descriptions

Longevity

short = less than 5 years;
medium = 5-10 years;
long = more than 10 years

Best end use

H = hay (including haylage/silage);
P = pasture;
S = stockpiled

Drought tolerance

Relative tolerance to periods of moisture deficit.

Flood tolerance (period of Spring flooding)

None = less than 1 week flooding;
Low = 1-2 weeks;
Moderate = 2-5 weeks;
High = wet or waterlogged spring through fall

Winter hardiness

Relative adaptation to repeatedly survive winter conditions experienced in the BNFFG region.

Soil texture

S = Sandy;
S-L = Sandy-Loam;
L = Loam;
C-L = Clay-Loam;
C = Clay

Acidity tolerance

None = pH 7.0;
Low = pH 6.0;
Moderate = pH 5.5;
High = pH 5.0

Salinity tolerance

None = 0-1 dS m⁻¹;
Low = 2-5 dS m⁻¹;
Moderate = 5-8 dS m⁻¹;
High = >8 dS m⁻¹

Rate of regrowth

How quickly plants will recover following cutting or grazing.

First flowering

Timing of first flowering may be relevant to match species maturity for desired harvest window. Note that the provided time period is approximate and dependent on growing conditions.

Ease of Establishment

Description of relative ease of establishment under average field conditions.

Please note that the ratings provided in the following table are subjective and approximate and will vary among varieties within a listed species.

seeding

Forages should be seeded in a clean and firm seedbed at a depth ranging from ¼ to ½ inch deep. Seed quality has a large impact on establishment success and subsequent forage yield. For complete seeding and establishment guidelines, review the British Columbia Rangeland Seeding Manual, the Alberta Forage Manual or consult with a local forage agronomist.

Common perennial tame forage species in the Bulkley-Nechako & Fraser-Fort George regions

Species	Precip. range (mm)	Longevity	Best End Use	Drought tolerance	Flood tolerance	Winter hardiness	Soil texture	Acidity tolerance	Salinity tolerance	Rate of regrowth	First flowering under adequate moisture conditions	Ease of establishment	Bloat causing	Notes
Legumes														
Alfalfa	300-600	med	H, P	high	low	mod-high	all	low	mod	good	June-July	good	yes	
Alsike clover	400-600	short	H, P	low	high	mod	L ₁ , C-L, C	high	low	good	June	good	yes	
Red clover	400-600	short	H, P	low	low	low-mod	L ₁ , C-L, C	high	none	exc	June	exc	yes	
White clover	400-600	med	P, (H)	low	low	low	L ₁ , C-L, C	mod	none	exc	June	good	yes	
Birdsfoot trefoil	400-600	med	P, H	mod	high	low	all	mod	mod	good	June	good	no	
Cicer milkvetch	350-600	long	P, S	high	low	high	all	low	low	mod	late June	poor	no	
Sainfoin	300-600	med	H, P	mod	low	mod	all	low	none	mod	June	good	no	
Grasses														
Meadow brome	350-600	long	P	high	low	mod	all	mod	low	exc	July	mod	no	
Hybrid brome	300-600	long	H, P	high	low	mod	all	mod	mod	good	July	good	no	
Smooth brome	350-600	long	H, (P)	high	mod	high	all	mod	mod	fair	June	good	no	
Orchard grass	400+	med	H, P	mod	low	mod	L ₁ , C-L, C	mod	low	exc	June	good	no	
Timothy	400-600	med	H, P	low	mod	low-mod	all	high	low	fair	June	good	no	
Altai wildrye	300-600	long	P	high	low	high	L ₁ , C-L	low	high	fair	June	poor	no	
Dahurian wildrye	300-600	short	H, P	mod	low	mod	all	low	high	good	June	mod	no	
Russian wildrye	200-450	long	P, S	high	low	high	L ₁ , C-L, C	low	high	good	June	poor	no	
Meadow fescue	400-600	med	P, S	low	mod	low	L ₁ , C-L, C	mod	mod	good	July	mod	no	
Tall fescue	400-600	long	P, H	low	mod	low-mod	L ₁ , C-L, C	high	mod	exc	June	good	no	
Creeping foxtail	400+	long	P	low	high	high	L ₁ , C-L, C	mod	mod	good	June	poor	no	
Meadow foxtail	400+	long	P	low	high	high	C-L, C	mod	none	good	June	poor	no	
Crested wheatgrass	200-450	long	P, H	high	low	high	all	low	mod	poor	early June	good	no	
Tall wheatgrass	300-550	long	H, P	mod	mod	mod	L ₁ , C-L, C	low	high	poor	June	poor	no	
Reed canary grass	350-600	long	H, P	mod	high	mod	L ₁ , C-L, C	high	low	good	early June	mod	no	

legumes

Legumes are noted for their high protein content and high digestibility. If inoculated with the appropriate nitrogen fixing bacteria, legumes can fix much of their own nitrogen and benefit other non-legumes in the stand. Many legumes can cause bloat and need to be managed accordingly.

Alfalfa *Medicago sativa*

Adapted to a wide range of soil textures but prefers well drained soils. Can cause bloat and should be managed accordingly. Winter hardiness depends on cultivar, health of crown, snow cover, age of stand, nutrient management, and stand management especially in fall. Select varieties resistant to verticillium wilt. Characteristics among varieties vary greatly, choose according to field requirements. About 220,000 seeds/lb or 500,000 seeds/kg.



Photo credit:
K. Lindquist

Alsike clover *Trifolium hybridum*

Often used in short-rotation forage stands but can persist longer if allowed to re-seed. Can offer a legume alternative in acidic soils with high moisture conditions. Lower drought tolerance and requires steady moisture. Uses the same rhizobium inoculant as red and white clover. Can cause photosensitization (an abnormally heightened reactivity of the skin or eyes to sunlight) and clover poisoning, especially in horses. About 680,000 seeds/lb or 1,500,000 seeds/kg.

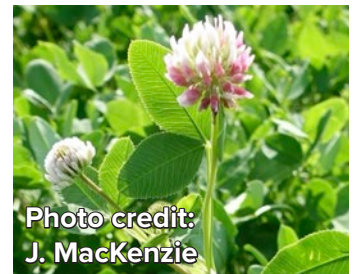


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J. MacKenzie

Red Clover *Trifolium pratense*

Tolerance of high acidity makes it adapted to most areas across the BNFFG. Less drought tolerant than alfalfa but more drought tolerant than alsike clover. Short-lived unless allowed to re-seed itself. Single and double-cut varieties available although double-cut types are less winter hardy. About 272,000 seeds/lb or 600,000 seeds/kg.



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K. Lindquist

White Clover *Trifolium repens*

Three types are found including small (naturalized), intermediate (common or white Dutch) and large (Ladino). Large types are preferred for hay but require higher moisture and are least persistent among the white clover types. Has a shallow root system with limited access to moisture. Low winterhardiness especially when stolons are exposed without snow cover. Very good grazing tolerance. About 800,000 seeds/lb or 1,764,000 seeds/kg.

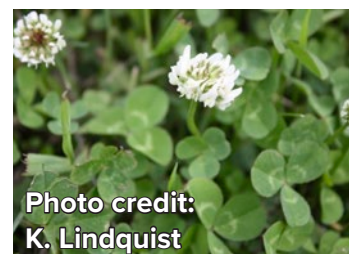


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legumes, continued

Birdsfoot trefoil *Lotus corniculatus*

A non-bloat legume adapted to wet and acidic soils. When seeded in mixtures choose non-aggressive grasses like timothy and tall fescue. Stand persistence depends on crown survival and ability to re-seed itself. Lodging can make hay harvest challenging. Grazing should be delayed until a full canopy has developed. Avoid grazing too close to avoid depleting root reserves. Also avoid cutting in fall to allow for adequate root reserve buildup for winter survival. About 370,000 seeds/lb or 815,000 seeds/kg.



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T. Mulhern Davidson

Cicer milkvetch *Astragalus cicer*

Slow to establish, usually requires two years. Seed should be scarified (which involves scraping or damaging the wall of hard seed). Good competitiveness once established. Excellent winterhardiness and non-bloating legume. Not suited for hay due to prostrate growth and slow dry down. Moderate drought tolerance. Adapted to pH ranges from 6.0 to 8.1. Adapted to a wide range of soils and spreads through rhizomes. Does best on finer clay or loam soils. About 122,000 seeds/lb or 270,000 seeds/kg.

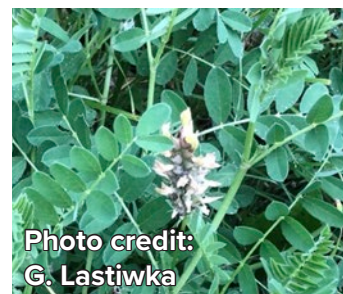


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G. Lastiwka

Sainfoin *Onobrychis vicifolia*

Does best when allowed to self-seed at regular intervals to assist with stand persistence. It is very palatable and non-bloating. Avoid grazing too closely and provide rest during the 4-6 week period before first frost to support winter root reserve buildup. Suited to well-drained, coarser textured soils. Large seeds generally allow for good germination. Inoculant is hard to obtain and is different from other legume inoculants. In mixtures it should be matched with bunchgrasses as sainfoin is a poor competitor. About 30,000 seeds/lb or 66,000 seeds/kg.

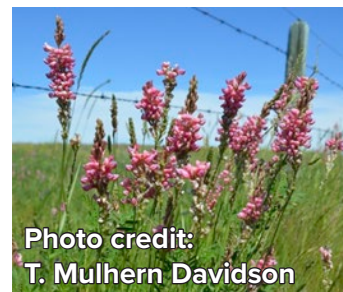


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grasses

Generally providing lower forage quality compared to legumes. Grasses offer wider climatic and soil adaptations, longevity, and grazing tolerance. They often make up the bulk of a pasture stand. Grasses can be distinguished into bunch grasses, which are less aggressive in mixtures, and the more aggressively spreading rhizomatous grasses.

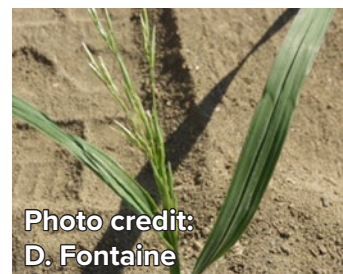
Meadow brome *Bromus riparius*

Range of adaptation is similar to smooth brome except that leaf growth is basal. The low leaf attachment make it best suited for pasture. Offers good grazing tolerance and faster regrowth than smooth brome. Good drought tolerance. Performs best in moist soils but has poor tolerance to excess moisture. Can tolerate up to 2 weeks of spring flooding. About 87,000 seeds/lb or 191,000 seeds/kg.



Smooth brome *Bromus inermis*

A widely adapted dual purpose forage species. Regrowth following cutting or grazing is slow. It is considerably more drought tolerant than timothy or orchard grass and has good winter hardiness. Older stands without legumes tend to get sod bound. Its aggressive spreading can outcompete legumes and can be invasive in native pasture and range. It can be recognized by the m-shaped “watermark” on its leaves, lack of hairs and V-shaped collar. About 143,000 seeds/lb or 315,000 seeds/kg.



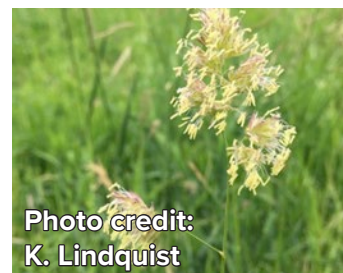
Hybrid brome *Bromus inermis x Bromus riparius*

Is a cross between meadow and smooth brome to create a dual-purpose forage for hay and pasture. It has better regrowth than smooth brome and is more conducive to haying than meadow brome. Adaptations are comparable to smooth and meadow brome. Characteristics will depend on whether the variety more closely resembles smooth or meadow brome. About 91,000 seeds/lb or 200,000 seeds/kg.



Orchard grass *Dactylis glomerata*

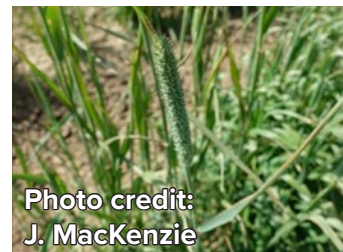
Moderate winter hardiness can be a limiting factor. Select hardiest varieties available such as Early Arctic and AC Killarney. Well adapted to grazing and regrows well. In hay stands it matures earlier than single cut red clovers or other later maturing legumes. Grows well in pH ranges from 5.5 to 7.5 but does not do well in saline or saturated soils. About 427,000 seeds/lb or 942,000 seeds/kg.



grasses, continued

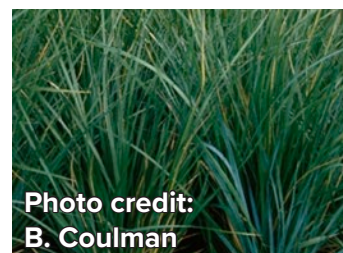
Timothy *Phleum pratense*

Shallow rooted and intolerant of drought. Grows well in a pH range down to 5.0 but has low tolerance to soil salinity and alkalinity. It can withstand spring flooding, short-term flooding during the growing season, and tolerates saturated soils. It is easier to manage in hay stands. It does not tolerate repeated grazing well and quickly loses palatability after heading. About 1,163,000 seeds/lb or 2,564,000 seeds/kg.



Altai wildrye *Leymus angustus*

Seedlings grow and establish slowly compared to most other grasses. Poor competitor with weeds during establishment. Can provide good fall, early winter and stockpiled forage. Good palatability later in the season. Tolerant to drought salinity and alkaline soils. Does not tolerate spring flooding or saturated soils. About 60,000 seeds/lb or 133,000 seeds/kg.



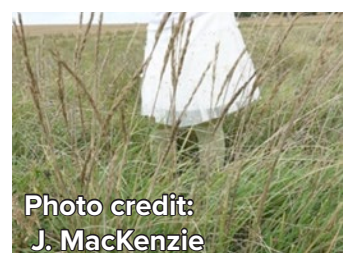
Dahurian wildrye *Elymus dahuricus*

Very competitive and quick to establish but becomes less competitive as the stand ages. Persists for 1-3 years. Dahurian wildrye is often added in lower amounts to provide quick cover during the early establishment of a forage stand. Low palatability after heading. About 88,000 seeds/lb or 194,000 seeds/kg.



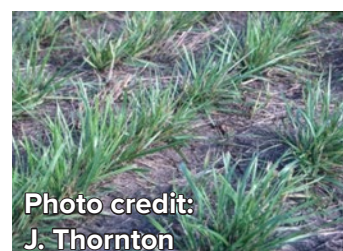
Russian wildrye *Psathyrostachys junceus*

Widely adapted, long-lived pasture grass. Provides high quality fall and early winter forage but should not be grazed in early spring. Very drought and cold tolerant. Does not tolerate spring flooding or saturated soils. Challenging and slow to establish, requiring wide row spacing and should be seeded in alternate rows to minimize competition. About 162,000 seeds/lb or 358,000 seeds/kg.



Meadow fescue *Festuca pratensis*

Adapted to warmer and wetter areas across the region. Limited by winter hardiness and shallow roots. Tall fescue may be used instead. Better suited to pasture use than hay. It can tolerate soils with pH as low as 5.0 but does better in more moderate conditions. It has a good tolerance for soils with poor drainage. About 230,000 seeds/lb or 507,000 seeds/kg.



Tall fescue *Festuca arundinacea*

Availability of endophyte-free varieties has made tall fescue more widely used for pasture and hay. Good palatability in vegetative stages. It is very tolerant to acidic soils and can grow in soils with a pH as low as 4.7 but does best in more moderate soils. About 230,000 seeds/lb or 507,000 seeds/kg.



grasses, continued

Creeping foxtail *Alopecurus arundinaceus*

Noted for its early spring growth and good production throughout the season with sufficient moisture. Seed bridging, which can prevent seed flow in seeding equipment, can be a challenge for seeding. Best suited for early pasture use. It can be challenging to manage in stands as it matures before other forages and palatability decreases significantly after heading. In cool moist sites, it can spread and become invasive. About 786,000 seeds/lb or 1,733,000 seeds/kg.



Photo credit:
T. Clarke

Meadow foxtail *Alopecurus pratensis*

Appearance and adaptation are similar to creeping foxtail but without the presence of creeping roots. A light and fluffy seed that can bridge easily during seeding. Best suited for early pasture use. Matures very early and loses palatability after heading which makes it difficult to manage in mixtures. Like creeping foxtail it can be invasive and spread easily through seeds. About 576,000 seeds/lb or 1,270,000 seeds/kg.

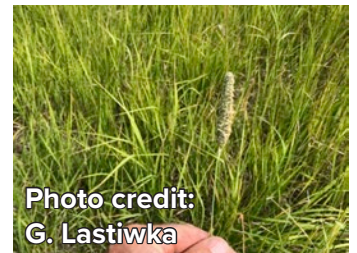


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Crested wheatgrass *Agropyron cristatum*

Early growing and best suited as an early spring forage. Palatability quickly drops after heading and regrowth is slow. Can spread aggressively and is often considered invasive on native rangelands. Has excellent winter hardiness and drought tolerance. Does not tolerate saturated soils or flooding. About 194,000 seeds/lb or 428,000 seeds/kg.



Photo credit:
K. Lindquist

Tall wheatgrass *Elytrigia elongata*

Noted for its tolerance of saturated, saline, and alkaline soils. Late maturing but turns very coarse in later stages of growth. In mixtures, grazing animals may select against it although palatability is good before stem elongation. Not yet widely used in the BNFFG regions. About 75,000 seeds/lb or 166,000 seeds/kg.

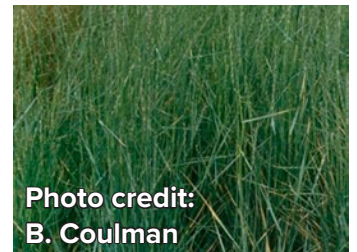


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B. Coulman

Reed canary grass *Phalaris arundinacea*

Well adapted to wet sites where it can be very productive. Palatability is good during vegetative growth but rapidly declines as stems develop. Select low alkaloid varieties for better palatability. Mainly used for hay but can also be managed for grazing if grazed before palatability declines. About 538,000 seeds/lb or 1,186,000 seeds/kg.



Photo credit:
J. MacKenzie

references

Aasen, A. and M. Bjorge. 2009. **Alberta Forage Manual. 2nd Ed.** AB Agric Agdex 120/20-1, Edmonton, AB. www.agricultur.alberta.ca/publications.

Dobb, A., S. Burton. 2013. **Rangeland Seeding Manual for British Columbia**, B.C. Min. Agri., Sust. Agri. Mgmt. Br., Abbotsford, B.C.
https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/rangelands/bc_rl_seeding_manual_web_single_150dpi0904.pdf

Forage U-Pick tool

<https://upick.beefresearch.ca>

NRC-USDA Plant Guides

<https://www.ars.usda.gov/pacific-west-area/logan-ut/forage-and-range-research/>

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