

Pasture and Forages for Wapiti



Introduction

This publication discusses perennial forage species selection and pasture management for elk, taking into account factors unique to this animal and industry.

The information is taken from research papers, case studies, books and pasture surveys with experienced producers. Information relevant to the domestic producer has been gleaned from the references written for wildlife populations. The pasture inspection and survey with experienced producers added substantially to the knowledge base.

Grazing History

Some elk producers have expressed concern over the lack of shrubs and trees on their land. They believe elk need woody growth for browse and shelter, because in the wild this is where we normally find them today.

Before European settlement, about 10 million elk populated the majority of North America. Some populations lived in eastern and western forests. Others roamed the middle of the continent - the North American Great Plains that stretched from Texas to the boreal forest of Western Canada. This area was a vast ocean of open prairies where grasses, sedges (grass-like plants) and forbs (broadleaf plants) were the main vegetation. Trees and shrubs were kept in check by periodic fires and periodic intensive grazing by large herds of migrating bison.



The settlement of the Great Plains forced the elk to migrate into the boreal forest to survive.

Because of the fertile grassland soils and the favourable topography, most of the Great Plains were settled and ploughed. In order to survive, the elk from the prairies were forced to migrate to forest areas as a second resort.

Diet Selection

Ruminant animals are grouped into three categories: (1) grazers: select mostly grasses and sedges; (2) browsers: select mostly forbs and the leaves, twigs and bark of trees and shrubs; and (3) mixed feeders: adapted to grazing grasses, forbs and woody plants.

Elk are mixed feeders. They can readily switch from grass to forbs to browse, so they can be raised on a wide variety of vegetation profiles.

Land suitable for elk can vary from native grassland in the Brown Soil Zone to areas with high bush component in the Black and Grey Wooded Soil Zones.

In the wild elk show a preference for grasses and forbs which make up about eighty per cent of their diet. Pasturing them on a seeded perennial grass/legume mixture suits their natural diet selection.

Two sources mention that, collectively, legumes and forbs are grazed more in summer; grasses are preferred in fall, winter and early spring. The reasons are not well understood but they may have to do with the stage of plant growth and forage availability.

Seasonal Metabolic Cycle

Growth, appetite and energy requirement of elk are seasonal. Northern wild ruminants prime themselves to exploit the brief flush of summer vegetation.

Growth is characterized by winter weight stasis, followed by compensatory summer gain, with a fattening phase in fall. Appetite is strongly seasonal, with the peak at summer solstice and minimum near winter solstice in females. In males, the minimum is during rut. Appetite increases at least 40 per cent from winter to summer in non-breeding animals. Lactation increases dry matter intake by about 100 per cent.

Elk have a high summer energy requirement. The fasting metabolic rate (energy required for body maintenance) of elk is comparable to cattle in winter. In summer the rate is about 50 per cent higher.

Table 1: Suggested minimum nutrient levels in wapiti diets (dry-matter basis)*

	Protein	TDN
3 - 6 month old	18 - 20	67 - 69
6 - 9 month old	16 - 18	63 - 65
9 - 18 month old	12 - 14	58 - 60
Cows gestating		
12 - 24 weeks	10 - 12	56 - 58
24 - 36 weeks	12 - 14	58 - 60
Cows lactating		
0 - 6 weeks	14 - 16	63 - 65
6 - 12 weeks	12 - 14	60 - 62
Bulls		
Maintain	8 - 10	51 - 53
Antler growth	10 - 12	53 - 55
Numbers in bold are periods where unmanaged pastures are more likely to fall short of requirements. *Source: Watkins, 1991, Haigh and Hudson, 1993		

Table 1 lists suggested minimum requirements. From early May to mid-July, hinds can meet their needs on actively growing 50 per cent alfalfa and 50 per cent meadow brome grass pasture. From mid-July to September, the primary spring growth of this mix would drop to about 10 percent protein and 50 per cent TDN - well below the hind's requirement. Animals will compensate for this by

selecting more leaves and fewer stems in an old growth stand. **To ensure adequate quality regrowth, late-season paddocks should be grazed or hayed in early summer.**

Grazing Legumes - the Non-Bloat Advantage

Elk producers have the luxury of pasturing bloat-causing legumes with an animal that is virtually bloat free. Reports of death due to bloat are quite rare. Grazers, mixed feeders, and browsers have physiological differences in their four-chambered stomachs (rumen, reticulum, omasum, abomasum) which affect forage digestion. Grazers have slow rates of fermentation with structures in the rumen to slow down the rate of food passage. This allows gas time to build up and cause bloat. Mixed feeders and browsers have more open communication between the stomachs. The rate of fermentation and food passage is rapid, so gases have less chance of building up.

When properly inoculated, legumes fix a portion of their nitrogen requirements from the atmosphere. In a grass/legume pasture, the forage passes through the animal and the nitrogen fixed by the bacteria associated with the roots of legumes becomes a free source of fertilizer for the grass. Legumes also provide the animals with a high protein feed.

Grazing Management

Constraints

When pastures are grazed heavily and continuously, forage production will be lowered and/or desirable species will be eliminated.

Pasture management that allows rest periods has challenges unique to the elk industry because of the high cost of fence. Unlike the beef industry, paddocks cannot be subdivided at low cost with a single strand of electric wire.

Stocking rates

Table 2 gives initial stocking rate recommendations for seeded forages in Saskatchewan. These figures allow a 30 per cent carryover to maintain the pasture in good condition. Animal Unit Month (AUM) is the amount of forage consumed by a 1000 lb. beef cow in one month. A 600 lb. elk is equivalent to 0.7 Animal Units (AU).

	Soil Texture					
	Heavy and Medium			Light		
	Stand Age Years					
Soil Zone	1-3	4-6	7+	1-3	4-6	7+
Brown	1.1	0.8	0.7	0.9	0.7	0.5
Dark Brown	2.1	1.4	1.2	1.8	1.2	1.0
Black and Gray	2.2	1.6	1.2	1.9	1.4	1.1
* Source: Saskatchewan Agriculture. 1995. Initial stocking rate recommendations for seeded forages in Saskatchewan.						

Table 2. Initial stocking rate guide (AUM/acre) for 50 per cent creeping-rooted alfalfa and 50 per cent meadow brome grass pasture in good condition*.

Table 3 lists the acres required by an adult elk for a six month grazing season. To calculate, divide AU equivalent by AUM/acre and multiply by months of grazing. For example, the formula to determine the acres required on a five year old stand in the Black Soil Zone on a medium textured soil for six months is as follows:

$$0.7 \text{ AU} \div 1.6 \text{ AUM/acre} = 0.44 \text{ acres/month}$$

$$0.44 \text{ acres/month} \times 6 \text{ months} = 2.64 \text{ acres}$$

	Soil Texture					
	Heavy and Medium			Light		
	Stand Age Years					
Soil Zone	1-3	4-6	7+	1-3	4-6	7+
Brown	3.8	5.2	6.0	4.7	6.0	8.4
Dark Brown	2.0	3.0	3.5	2.3	3.5	4.2
Black and Gray	1.9	2.6	3.5	2.2	3.0	3.8

* Calculated from Table 2 as explained in the text.

Table 3. Acres/adult elk based on six month grazing season, 30 per cent carryover, 50 per cent creeping-rooted alfalfa and 50 per cent meadow brome grass pasture in good condition*.

Plant stage

With most forages, the stage of plant growth is more important for palatability and nutrition than plant species. There are many examples where elk have selected the younger, vegetative plants over mature plants of the same forage species. One study showed elk use toughness to chew when assessing plants for their daily diet. They were less concerned with the species of plants, as long as they were tender.

Wildlife managers have known for decades that palatability is related to stage of plant growth. In spring, elk graze the 'green line' as the snow melt advances up the mountain, or they select pastures that were grazed the previous year. In fall and winter elk prefer to graze on succulent forage regrowth where plants were either grazed or hayed in early summer. Land that is continuously rested has mature grasses and forbs that are tough, less palatable and lower in nutrition. These areas are avoided unless there are no other choices.

Wildlife managers are now prescribing rotational grazing systems with beef cattle to set up forage regrowth for elk.

The main objective during the grazing season is to provide the animals with plants that are in a vegetative state for as much of the season as possible. This is a challenge because nature quickly advances vegetative plants in spring to their reproductive phase in early summer. Unless forages are manipulated, the majority of growth is condensed into May and June.



Alfalfa/meadow brome paddock in vegetative stage.

During times of rapid plant growth, producers have noticed elk will avoid grazing in low areas where growth is the most succulent. If the paddock is cut at this stage, the elk will graze on the windrows after the material has dried. It may be beneficial to offer good quality hay or allow for old stockpiled growth from the previous year when forages are growing rapidly.

Another reason for allowing some old growth is to provide shelter for newborns in calving paddocks. This becomes more important if there are no shrubs or trees where the calves can use their "hider strategy." Producers notice the calves appear more secure if they have some form of taller growth where they can hide.



Elk calf using the "Hider Strategy". Old growth in calving paddocks will provide cover.

Paddock size

Controlling plant stage with grazing during rapid spring growth would require small paddocks (0.2-0.5 acres/adult). To reduce fence cost per acre, paddock size can be increased, and the extra growth cut for hay. The haybine becomes a valuable pasture management tool. It acts as a uniform grazing animal that prevents stemmy underutilized plants. In calving paddocks, a minimum of one acre per hind is suggested to reduce social stress and disease.

In cases of one large paddock and few animals, portions of the field can be cut at different times. This will help keep areas inside the paddock vegetative through the grazing season. The animals still have access to the entire paddock so this strategy is less than perfect range management. The long-term goal is to have more paddocks to enable the employment of an appropriate grazing system.

Rest requirements

There is a saying "Forage plants cannot be overgrazed, they can only be under-rested." This means they can tolerate a one-time heavy use, provided they are given adequate time to recover. When a hay field is cut in mid-summer, most of the plant top growth is removed. To compensate for this heavy use, the field is given a 364-day recovery period to ensure a good hay crop the next year.

Forage plants are adapted to grazing. They have evolved with clipping pressure from grazing animals. However forage plants do not tolerate repeated clippings when they have not recovered from the previous grazing. Under this continued management, the plants will weaken and eventually die.

Forages are susceptible to weakening from mid-August to the end of September when storing carbohydrate root reserves for winter. This does not mean grazing should stop in this time period. The grazing manager needs to be aware that in the paddock where fall grazing occurred, growth may be slower next spring. This paddock will require extra rest.

Winter grazing

Winter grazing is an option for part of the winter. Provided the snow is reasonably soft, producers have observed the animals show a willingness to graze in 12 inches of snow even though hay bales are provided. Wildlife managers report elk switch from grazing to browse when snow is deeper than 18 inches.

One of the laws of ecology is "There is no such thing as a free lunch." Paddocks that receive growing season use followed by dormant season grazing will usually require greater rest the following spring to maintain plant vigour.

Forage species selection

When selecting forages to seed, there are three questions to consider:

1. Which species are most palatable through the seasons?
2. Which species give high growth rates, high conception rates and heavy antlers?
3. Which species produce the highest forage yield.

Many attempts have been made to determine which forage species are most palatable to elk. The conclusions are not consistent, probably because of differences in experimental conditions. When the information is pooled, two points can be extracted. The first is elk are mixed feeders - they will eat a wide variety of plants offered to them. The second is plant stage usually has more effect on palatability than plant species. Young, succulent leaves of less palatable species are selected over tough, mature leaves of a desirable species.

There is no research to determine which plant species give the highest antler or body weight gains. One could speculate combinations of plants that give high quality feed for as many days as possible during the grazing season would accomplish this goal.

To determine which forages produce the highest yields for your area, refer to the Forage Crop production Guide (see also species description in a later section). The species that are suited for your soil zone and your particular soil characteristics, such as texture, drainage and salinity, will give the best long-term production.

Pasture mixtures

Elk do not prefer a single-species diet. In a grass/legume mix where the legume dominates, the grass is grazed heavily. In mixes high in grass, the legume is overgrazed. Without scientific proof to back this recommendation, producers should aim for 50 per cent grass and 50 per cent legume in a seeded paddock.

Normally, it is recommended one grass and one legume be seeded together in a paddock. There may be a case for considering separate seedings inside a single paddock. This is not recommended for paddocks that are added as you expand, but may have a place for the starting producer with one pasture. You may seed one part to crested wheatgrass to provide the earliest possible green growth. The rest of the paddock could be seeded to meadow brome and alfalfa for summer grazing.

Complex pasture mixtures can be difficult to properly manage. There is an opportunity for some species to be overgrazed and others undergrazed. Over time, the most palatable species have a greater chance of being grazed out, leaving behind the least desirable species.

A case for recommending complex pasture mixtures is when the topography and soils of a paddock are variable. Species suitable for the hilltops will not survive in the potholes. A mixture ensures that each acre is producing.



Quackgrass pothole in foreground is grazed heavily in a paddock dominated by alfalfa.

Plant species description

Alfalfa

Alfalfa is the most common legume elk producers are seeding. It has a proven record for high production and persistence across all of the soil zones, making it the best suited legume available.

In one grazing trial, elk found alfalfa less palatable than some of the other legumes. Other literature and producer experience all confirm that alfalfa is readily grazed.

Alfalfa supplies a high quality feed. A rule of thumb in the beef industry is an acre of alfalfa will produce twice the pounds of beef as an acre of grass. Because elk seldom bloat, producers were seeding paddocks to 100 per cent alfalfa.

In stags, high-protein pastures and feedstuffs that exceed the requirements for long periods of time lead to acidic urine. This increases the incidence of ulcerated penises. Uro-genital ulceration in hinds is less common. One producer has noticed scours when grazing 100 per cent lush alfalfa. In the dairy industry, cows grazing straight alfalfa will have high blood urea nitrogen levels. This can cause fertility problems when the animals are grazing these pastures before and during the breeding season. These problems are lessened if the alfalfa plants are more mature because the protein levels will be lower. Seeding 100 per cent alfalfa in paddocks should be avoided.

The creeping rooted varieties are more winter-hardy and more persistent under grazing and harsh growing conditions. The crown of the plant is lower in the soil, which helps to protect it from trampling. Creeping rooted varieties are recommended in all soil zones.

The tap rooted varieties are higher yielding under hay production because of a deeper root system. They are less resistant to grazing because the crown is carried higher in the soil, exposing it to trampling. Their more rapid regrowth leads to depletion of root reserves under frequent grazing. Tap rooted varieties are not recommended in the Brown Soil Zone because they may not survive over the long term. They are recommended in all other soil zones.

Sainfoin

One grazing trial found sainfoin was the legume most preferred by elk in all seasons. In winter, they showed a strong preference for sainfoin. At least one landowner would agree with this report. Wild populations of elk graze his sainfoin hay field heavily in fall and winter.

One elk producer surveyed is grazing sainfoin. There are separate plots of alfalfa, sainfoin and smooth brome grass in a paddock. The paddock was hayed in summer and the regrowth grazed in fall. The elk did not appear to show a preference for sainfoin over alfalfa.

Sainfoin is promoted in the beef industry as a non-bloating legume. This feature is not important to elk producers because the animals very seldom bloat. Sainfoin could be considered if a producer wanted to offer the animals more selections or a change of diet.

Sainfoin yields 80-85 per cent of alfalfa over the long term. It has a big seed and is considered easy to establish. In some cases, it has outyielded alfalfa in the first two years because of the quick establishment. It is drought-tolerant and is recommended in the Brown, Dark Brown and Black Soil Zones.

Alsike clover (AC)

One grazing trial found that elk readily graze AC in spring and summer. It was selected equally along with alfalfa and sainfoin. Producers who have seeded AC agree it appears quite palatable.

AC tolerates up to six weeks of spring flooding. Producers include it in pasture mixes because it provides a legume component in potholes where alfalfa drowns. AC is a short-lived perennial plant, but, once established, remains in the stand by reseeding itself.

AC is recommended in the Grey Wooded Soil Zone because it needs high moisture to survive and produce good yields. In all other soil zones, AC is limited to the low flooding areas in the pasture. If seeded on drier sites with competition from other forages, it will likely not survive.

Cicer milkvetch (CM)

One grazing trial found mature CM plants were palatable to elk in late summer and winter. New plant growth was rarely selected in spring when other legumes were available. None of the producers surveyed have been using CM.

CM is slow to begin growth in spring, but its growth continues well into fall. It retains green leaves late into the season so the plant cures well for fall or winter grazing. Numerous studies agree that, in fall, mature stands of CM have significantly higher protein and energy than mature stands of alfalfa.

CM could be recommended for a paddock if you wish to stockpile an entire season of growth for fall or winter grazing. It could be seeded by itself provided there are other grasses available in the paddock. If the intention is to mix CM with a grass suitable for stockpiling, Russian Wild Rye and Creeping Red Fescue would be the better choices.

Yields of CM can vary considerably compared to alfalfa, but typically it yields 20 per cent less than alfalfa. CM does not produce as well when managed with multiple clippings in a season. It can equal alfalfa production when stockpiled and cut or grazed once in fall. In some cases, it has outyielded alfalfa because of its resistance to pocket gophers.

CM has been unpopular because of low germination rates and weak seedlings. If a cover crop is used, it generally takes two or more years for a stand to develop. When a cover crop is not used and weeds are controlled with herbicides or mowing, a good stand can be established in one season.

CM is recommended in the Moist Dark Brown, Black, and Grey Wooded Soil Zones

Meadow bromegrass (MB)

MB is the most common grass elk producers are seeding. It is highly recommended by livestock producers who use it for grazing. A recent grazing trial and many producer observations all confirm it is very palatable to elk. This is an ideal pasture grass when you consider the characteristics of the plant.

MB has a weakly creeping root. This less-competitive feature gives the legume component in the stand a better chance to survive over the long term. Most of the leaves originate from the base of the plant, with their growing point near the soil surface. When the plant is grazed, the growing point remains intact and the leaves regrow quickly. Ungrazed plants remain relatively soft and palatable over the summer. When the stand is three or four years old, MB produces fewer coarse seed stalks.



After three years, smooth Bromegrass on the left has filled in. Meadow Bromegrass on the right is still in rows.

MB is not well suited for hay production.

Because of its basal growth form, cutting and baling can leave behind a large portion of leaves. Some producers actually prefer this characteristic in a grass/alfalfa paddock that is first hayed and then grazed. In the initial cutting, the bales will be a high percentage of alfalfa. The regrowth after haying gives a balance of grass and legume for grazing in late summer and fall.

In spring, MB starts growth four to seven days later than Crested Wheatgrass and Russian Wild Rye. It does not tolerate continued close grazing in early spring and summer. Grazing should be delayed until the sward reaches eight-10 inches or production and longevity will be compromised. MB can be stockpiled for late summer and fall grazing.

MB will survive in the Brown Soil Zone provided it is rotationally grazed, allowing for rest and recovery. It is recommended in the Dark Brown, Black, and Grey Wooded Soil Zones where rotations are important but less critical.

Smooth bromegrass (SB)

Both research and producers confirm SB is readily grazed by elk during the growing season. Some producers have observed mature stands of SB will not be grazed in winter, while others find the opposite is true. One grazing trial rated SB as one of the more palatable grasses in winter.

SB has a strongly creeping root system which makes forage growers either love it or hate it. The aggressive rhizome forms a dense sod that spreads into open areas. This is a welcome feature where there are problems with soil erosion or patchy stand establishment. The disadvantage of the creeping root is it tends to choke out the legume component in the stand.

SB is suited for haying because of its upright growth. It is commonly used in pasture seedings because of its palatability and persistence, however it is slow to regrow after grazing. For paddocks that are intended for grazing, Meadow Brome is likely the better choice.

SB could be recommended in paddocks that have soil problems or paddocks where both haying and grazing are options. SB is recommended in all soil zones.

Crested wheatgrass (CWG)

Some producers have commented that elk will not eat CWG, however this is not entirely correct. In early spring, the primary tillers of CWG send out leaves. If these tillers are allowed to escape grazing, they soon begin to elongate into seed stalks. At this point, if the elk have a choice, they will select other grasses that are softer - which is exactly what beef cows do. The CWG is especially avoided if the primary tillers are allowed to mature and become "woffy."



Mature "woffy" plants of crested wheatgrass

Two producers are grazing CWG well into summer. In both situations, the stand is grazed enough to keep it vegetative. There did not appear to be any problem with palatability. One grazing trial studied the palatability of four wheatgrass species being evaluated for spring grazing purposes. Hycrest and Nordan CWG were as palatable as the other wheatgrasses when grazed in early spring in a vegetative state.

There are two types of CWG. The diploid types (Fairway and Parkway) are lower-growing with finer stems. They are better suited for grazing. The tetraploid types (Kirk and Nordan) are taller with coarser stems. They are suited for haying and grazing, but must be grazed early.

Some producers have observed elk will graze mature, wofly CWG clumps in winter. In both cases, the animals were feeding on hay but seemed to enjoy the activity of digging and grazing. If stockpiling forage for winter grazing is being considered, there are probably better choices than CWG.

If early spring growth for grazing is a priority, CWG should be considered. It starts growth four to seven days earlier than most grasses and is ready to be grazed when three to four inches tall. You may consider seeding one paddock to CWG to take the pressure off the other grasses in early spring.

Do not make the mistake of seeding too many acres to CWG, or it will get ahead of the elk and form wolfy plants. In the Brown and Dark Brown Soil Zones, seed 1/3 acre for each adult. In the Black and Grey Wooded soil zones, seed 1/5 acre for each adult.

CWG grows upright, making it suitable for hay production. It matures early but quality declines rapidly. When grown with alfalfa, the stand must be cut when the alfalfa is in the bud stage to get good quality hay from the CWG.

Russian wild rye (RWR)

One grazing trial offering stands of mature forage species found elk readily selected RWR in early fall. In this study, all of the easy-to-chew forage species were grazed frequently. Species tough to chew were avoided, with the exception of RWR. Even though it had thick cell walls that made it tough to shear, it was frequently selected by elk in early fall. In the same trial, RWR was seldom grazed in spring or winter.

Only one producer surveyed has a paddock of RWR and alfalfa. The pasture is grazed season long and it appears the RWR is being grazed during the entire summer.

Similar to Crested Wheatgrass, RWR will start growing about four to seven days earlier in spring than most other grasses. The advantage of RWR over Crested Wheatgrass is that ungrazed plants hold their quality better for summer and fall grazing. In the Brown Soil Zone, regrowth after spring grazing or haying is unreliable due to dry conditions. In order to ensure pasture volume for late summer and fall grazing, spring growth needs to be stockpiled in the dry years. This is one situation where some acres of RWR could be considered.

The main complaints about RWR are its lack of productivity and its difficulty of establishment. The advantage of RWR is it has proven itself to be hardy under dry and harsh grazing conditions.

In the Dark Brown and Black Soil Zones where summer regrowth is common, there are probably better choices than RWR. In the Black Soil Zone, RWR has the reputation of limited persistence.

RWR is a basal type bunch grass that is suited for grazing but difficult to cut for haying.

Intermediate Wheatgrass (IWG)

One grazing trial offered IWG. It was grazed only marginally in winter and avoided in other seasons. None of the producers surveyed are using IWG.

IWG is not well-adapted for grazing. It will not survive continuous season-long grazing. In a rotational grazing system, it will not survive repeated clippings unless there is good moisture and fertility.

IWG blooms at the same time as alfalfa - making the two very compatible for hay production. Over the long-term, it produces the highest hay yields of all grasses when mixed with alfalfa and cut once in a season. One feature of IWG is a coarse stem. If the stand becomes over-mature when cut for hay, one could speculate the stem would not be eaten by elk unless it was ground or chopped.

IWG can be grown in all soil zones. At this point, it is uncertain whether this grass is suited to the elk industry.

Timothy

Grazing studies with elk rate timothy from moderately to highly preferred during all seasons. None of the elk producers surveyed had seeded timothy.

Timothy produces upright growth for easy hay harvesting. If used for grazing, it will not survive under season-long continuous use. It provides good quality production in early summer, but mature plant quality deteriorates in late summer and fall.

Timothy is recommended only in the Moist Black and Grey Wooded Soil Zones. It has a high requirement for moisture, so it is ideally suited for low lying and peat soils. It will not produce or persist under drought conditions.

Orchard grass (OG)

One source lists OG as highly palatable to elk in all seasons. This is likely due to the soft leaves. One producer agrees elk find it quite palatable, especially when grazing immature plants in winter. Feed tests show OG is more digestible than most other grasses.

OG has high regrowth potential in mid-summer and fall when moisture conditions are good. It does not tolerate close and continuous grazing. If mixed with other grasses, it is usually grazed out because of its palatability.

OG has a high risk of winterkill, even with good management. It can be grown in the Black and Grey-Wooded Soil Zones. In one situation, OG is seeded in the Moist Dark Brown Soil Zone with alfalfa and meadow brome. This stand is cut once a year for hay and the OG is still producing well after four years.

Creeping red fescue (CRF)

One study showed elk were indifferent to CRF in spring and summer. In a winter grazing trial offering mature forage plants, CRF was selected above all other grasses offered.

Similar to Russian Wild Rye, the mature leaves of CRF retain their nutritive value and green colour after freeze up and into winter. CRF could be considered in the wet areas of the province when the entire season of growth in a paddock is going to be stockpiled for fall and winter grazing.

CRF is limited to the Moist Black and Grey Wooded Soil Zones. It is not suited for hay because the basal leaves make it difficult to cut. CRF has the reputation of being a low-yielding forage.

Quackgrass (QG) and Kentucky Bluegrass (KBG)

These grasses are palatable to elk. They are not seeded by producers, but can be found invading pastures in the Moist Dark Brown and Black Soil Zones.

QG and KBG often grow in low areas where other grasses and legumes have been flooded out. They are tolerant of heavy grazing and will creep into spaces where other plants are grazed out. Their appearance on upland sites can be a sign of deteriorating pasture condition.

Similar to smooth brome grass, QG produces good volume in the first three to four years but needs high nitrogen input afterwards to maintain production. KBG can survive extreme grazing but production is poor unless moisture and fertility are excellent. Low production in later years is the major drawback of these two species.

These grasses are often labelled as "weeds" so they are not recommended for seeding. If and when they appear in a pasture, they will likely be grazed. Controlling these grasses in an established stand is probably not necessary or economical, except in extreme cases where they have taken over the field.

Western Wheatgrass (WWG) and Northern Wheatgrass (NWG)

More interest has been shown in native grasses, but seed prices and availability have limited their use. WWG and NWG are two native species that have seed available.

One spring grazing trial showed NWG was preferred over other wheatgrasses. None of the elk producers surveyed were using WWG or NWG. Beef producers rate these native grasses as palatable and nutritious through summer and fall.

Some forages grow rapidly in spring and become virtually dormant in summer. WWG and NWG grow more slowly in spring and continue to grow in the hot, dry months. As a result, they can provide good quality summer pasture.

These two species can be grown in all soil zones. Because of lower yields compared to the "tame" grasses, they should probably be considered only in the Brown and Dry Dark Brown Soil Zones for mid-summer and fall pasture.

Native Prairies

Brown and Dry Dark Brown Soil Zones

In recent years there has been renewed interest in native prairie vegetation. Critics in the past dwelled on its low production when compared to seeded forages. It is now recognized that when properly managed, the native prairie can give reasonable production without fuel, fertilizer or machinery inputs. This may not be maximum production, but it may be optimum sustainable production. There are many beef producers who would trade back some of their old seeded grass stands for the original native vegetation.

High fence cost and low forage production discourage use of native prairie for elk pasture. One could assume elk would perform adequately on native vegetation as this was their diet before European settlement. The beef industry has found the best use of native prairie is to delay grazing in spring and stockpile the forage for summer and fall.

Moist Dark Brown and Black Soil Zones

Could elk one day replace machinery and diesel fuel as environmentally friendly browsing tool to control shrubs and trees?

When European settlers migrated to the Western Canadian prairies, they encountered a vast ocean of grass. The Brown and Dry Dark Brown Soil Zones had few shrubs and trees mainly because of drought. After a century of altered land management in these areas, woody growth has increased only marginally on the remaining native landscape.



Western Snowberry, Wolf Willow and Aspen Poplar dominate a native Rough Fescue/mixed grassland.

In the Moist Dark Brown and Black Soil Zones, the trees were held in check by a combination of factors. There is debate over which of them had the biggest influence. These factors were:

1. Periodic intensive grazing and hoof action by large herds of bison;
2. Fires set by lightning strikes;
3. Fires set by native North American people for the purposes of warfare and grass management to attract bison;
4. Mixed grazers (elk) that browsed on woody species.

With settlement, all of these factors have been removed or controlled. In the last century, woody growth on native pastures in the Moist Dark Brown Soil Zone has increased somewhat. In the Black Soil Zone, woody growth has increased significantly.

In many cases, trees and shrubs are an asset. They provide economical shelter for livestock and add beauty to the landscape. They also provide food and shelter for wildlife. However, there are now cases where the encroachment of woody species is more than what is desired.

Today, most native pastures in the Black Soil Zone are not "true native prairie." The original vegetation has been altered because the land is not subjected to the same treatments it was a 100 years ago. Aspen trees, shrubs, brome grass and Kentucky bluegrass have encroached on the native Rough Fescue and Speargrass prairie. This has happened on land used for grazing and on land left idle for wildlife.

For a livestock producer, shrub and tree encroachment is not critical until it reaches the point where grass production is noticeably reduced. The animals readily graze the brome grass and Kentucky bluegrass that have replaced the native species.

Naturalists, rangeland agronomists and graziers would prefer to see more of the original grasses restored on these native pastures for aesthetic and production reasons. Native grasses have characteristics that make them very desirable in a livestock operation. Rough Fescue and Speargrass cure well on the stem, making for good fall and winter grazing. True native prairie also supports a long list of other grass and forb species that will be lost if the encroachment continues unchecked.

Elk are mixed feeders. In the wild, about 20 per cent of their diet is browse from shrubs and trees. On many farms, elk are grazing out the woody growth. In some cases, this is not a welcome change because the producer is hoping to save the small amount of bush that is fenced. In wooded areas, elk may be an alternative to machinery and diesel fuel for clearing land to provide more pasture.

In 1985, an elk producer in the Black Soil Zone fenced a parcel of native pasture overrun with wolf willow (silverberry) and western snowberry. This paddock is grazed from July 1 to March 1 each year, with about 50 per cent grass carryover. In 1995, after two decades of grazing and browsing, the elk

eliminated most of the woody growth. Without scientific data to confirm a trend, the native grasses appear to be increasing.

It appears there are situations in the Black Soil Zone where prescribed elk grazing and browsing could have a positive impact on maintaining the native prairie vegetation. The season and level of use would need to be controlled and monitored to ensure it was giving the desired effect. Improper management with elk would have no benefit.



Ten years of elk browsing has controlled Western Snowberry and Wolf Willow (Silverberry).

For more information, contact:
Agriculture Knowledge Centre
Toll Free: 1-866-457-2377
Email: aginfo@gov.sk.ca