

Chemical Control

A number of different chemicals have been used in controlling downy brome. For small infestations, it is recommended that a spot sprayer be used for selective control. Larger areas that are infested may require larger equipment.

In most cases, application of chemicals should be conducted in the early spring. This is when non-target species are dormant, allowing for selective control. Glyphosate is recommended for non-selective control of downy brome. Glyphosate should be applied before the downy brome plants reach a height of six inches, and before any perennial forages have emerged. Refer to the "Crop Protection" Guide (the 'Blue Book') published annually by Alberta Agriculture, Food and Rural Development. This Features comprehensive and up to date information on application rates and procedures.

Fall applications have also been used to control downy brome but this is usually in cropland situations. If chemicals are to be applied in the fall, applications should be conducted after downy brome seeds have germinated and are beginning to grow.

Biological Control

As of yet, there are no successful biological control agents available.

SUMMARY

Downy brome is a competitive species that has started to invade and threaten many of our native grasslands. Its increase in abundance indicates that it is a problem which needs to be addressed. Management of this species should involve an integrated approach including monitoring. This is an extremely difficult weed to get rid of and it will take time and patience for the objectives to be accomplished.

FOR FURTHER INFORMATION ON WEEDS AND WEED CONTROL:

- 1. Alberta Invasive Plant Council**
(403) 638-3805; www.invasiveplants.ab.ca
- 2. Alberta Environmentally Sustainable Agriculture**
(780) 427-3885; www.aesa.ca

THANK-YOU!

Many thanks to the Saskatchewan Watershed Authority for donating the text and pictures for these fact sheets.

DESIGN, PRINTING AND DISTRIBUTION MADE POSSIBLE BY:

Government of Canada Habitat Stewardship Program
for Species at Risk
Alberta Conservation Association



6. DOWNY BROME in Native Grassland

**INTRODUCTION**

Bromus tectorum, commonly referred to as downy brome, cheatgrass, or 100-day grass, is an erect spring or winter annual that is a problem in many southern areas of western Canada. Introduced into North America in the 1860's, it has spread throughout southwestern Canada and is especially abundant in interior British Columbia as well as the Great and Columbia Basins of the western United States. Downy brome is most commonly found in rangelands, winter wheat fields, pasture lands, waste areas, eroded areas, and abandoned fields. Its long awns, which create a sharp seed, are easily caught in the fur of animals and clothing of people, making it easily transported to other areas. If not controlled, this quick spreading grass has the potential to work its way into our native grasslands, choking out native species and becoming a large threat to native grassland biodiversity.

THE PROBLEM

Native prairie is a part of our natural heritage and provides an important resource for grazing, wildlife habitat, and soil and water conservation. Threats like the invasion of exotic species can degrade our prairie ecosystem by excluding native species, and thus reducing biodiversity, carrying capacity, habitat, and the aesthetics of our prairie ecosystem.

A WELL ESTABLISHED GRASS

Downy brome grows on a wide variety of soils but thrives on medium to coarse textured soils especially those high in potassium. It is well adapted to low to medium precipitation zones and prefers low temperatures for germination and growth (3.5-15 degrees Celsius is the optimum growth temperature). The establishment of perennial grasses, forbs, and shrubs is greatly limited when downy brome has infested an area. Downy brome has many competitive advantages which enables it to become easily established and out compete other native species:



Interested landowners are encouraged to contact:

OPERATION GRASSLAND COMMUNITY

Alberta Fish and Game Association

6924 – 104 Street NW

Edmonton, AB T6H 2L7

Phone: (780) 437-2342 Fax: (780) 438-6872

On-line at: www.ogcpsp.com

· **It has a dense, fibrous root system that continues to develop over the winter allowing it to take full advantage of spring moisture. Downy brome makes more efficient use of water than perennial grasses, allowing it to produce greater biomass with less water.**

· **Its seeds are not limited to one germination season as with many other annual plants. Because germination can take place continuously throughout the year, establishment of the population is ensured.**

· **Seeds are shed shortly after maturity and if conditions are right, most will germinate immediately. If conditions are not favourable, seeds can develop a secondary dormancy which requires an extended period of moist conditions in order to break dormancy. This is very advantageous to downy brome as it allows seeds to occupy all available sites able to support germination, survive periods of limited moisture, and provides the ability to renew its population in case of environmental disaster.**

· **Downy brome is a cool season grass that completes its life cycle early in the season before soil moisture diminishes. This means that it has the opportunity to deplete moisture and nutrients from the soil before native species begin to grow. This is one of its greatest competitive advantages.**

· **Seed production is extensive and occurs much earlier than other species. Seeds are spread by wind and in animal fur. The sheer volume and number of seeds allows downy brome to fill any available niche in the forage cover and ensure that some germination will take place.**

WHY IS DOWNY BROME BECOMING A PROBLEM?

The ability of downy brome to begin growth and establishment so early in the season poses a large threat to our native prairie ecosystems. Native grasses start growing much later than downy brome, usually in early summer. By the time that native species start to grow, downy brome has already become established, effectively competing with other species for available soil nutrients and moisture. A downy brome community displaces native grasses and decreases the diversity of native grasslands.

Downy brome can spread quickly due to its large seedmass and germination abilities. This makes it difficult to get rid of once it has become established. Perennial grasses and shrubs are hard to re-establish in areas infested with downy brome resulting in further dominance of this introduced species.

DOWNY BROME AND GRAZING

In areas where downy brome has become a large part of the grassland ecosystem, it is considered to be a good source of forage for livestock early in its life-cycle and is often relied upon by many cattle producers. It provides an abundant supply of forage earlier in the spring than most species during years of adequate moisture. However, there are many drawbacks associated with using this grass as a source of feed. Although plentiful in the spring during wet years, growth is very limited in dry years. In a dry year, less than one seed may be produced per established plant. This makes it challenging to rely on it as a primary source of feed. Also, downy brome matures very quickly and is usually dried out by mid-July therefore resulting in reduced quality forage late in the season and a shorter grazing season. In addition, when mature, the seeds contain long, stiff awns which have been know to puncture mouth and throat tissue of livestock causing injuries and infections such as lumpy-jaw.

DOWNY BROME AND FIRE

Early maturation, complete summer drying, and an ability to accumulate litter makes downy brome an extremely flammable species. Areas infested with downy brome pose as a serious fire risk. Areas largely infested with downy brome are 10-500 times more likely to burn than uninfested areas. Fire is an important ecological tool for managing grasslands, but fires that burn more often than the natural fire interval are detrimental. Frequent fires reduce the cover of important perennial species which may not be adapted to such high frequencies, as well, these numerous, hot fires may leave the land vulnerable to erosion. In fact, downy brome can actually benefit from the occurrence of a fire. In downy brome ecology, fires are most likely to occur once downy brome is mature. Dry downy brome seed is very tolerant to heat allowing it to survive the quick burn that often happens during a prairie fire. Fire reduces forage cover opening up a germination environment better suited for downy brome. While the stand of downy brome thins often with fire, it is able to compensate by producing a greater number of stems and seeds per plant. This may result in a larger infestation of downy brome than before the fire occurred.

CONTROL OF DOWNY BROME IN NATIVE GRASSLANDS

The downfall of downy brome is the inability of its seed to survive in the soil for longer than two to five years. Since seed survival in the soil is short and downy brome relies exclusively on seed production to perpetuate, the management goal should be focused on eliminating seed production and exhausting the seed bank.

1. Timing

Timing is a crucial part of keeping downy brome under control. Control options must be implemented early in the season before the seed sets. Otherwise seeds can be deposited into the soil seedbank where they can remain and germinate for up to five years.

2. Accuracy

All areas infested with downy brome must be targeted. This includes the hard to reach, smaller areas as well. Only a few established plants are needed for re-establishment to occur.

3. A Continuous Effort

Treating an infested area once will not be effective. The presence of downy brome indicates that it will be producing seed; therefore multiple treatments are required to keep it at a reasonable level. Downy brome has a large seedbank, this allows it to re-invade an area even after a few years of control.

4. Monitoring

Areas that have a potential for downy brome infestation should be monitored every spring with special attention to areas where downy brome is commonly found. If an infestation is found, the location should be recorded and then further monitored to measure the rate in which the infestation is spreading. GPS (Global Positioning System) technology is an effective means of monitoring weed stands.

MANAGEMENT TECHNIQUES

Hand Picking

Hand picking of downy brome is an effective management technique for small infestations. As this method is very labour intensive, it is not recommended for larger outbreaks, but may be an effective way to manage once stands are reduced.

Mowing

Mowing can be used as long as it occurs at the bloom stage or within one week after flowering. To clip plants at the dough stage (when the seeds are well developed) will cause death but seeds may already be viable. Disadvantages associated with mowing are that often the shorter plants are missed enabling them to still produce seeds. It is important to use repeated mowing to be effective.

Grazing

On a repeated basis early in the spring, grazing can have some impact on the abundance of downy brome in a stand. High intensity grazing can almost eliminate downy brome infestations but a reduction in intensity will allow it to invade again.

If an area is highly infested and dominated by downy brome, an option could be to use it in a grazing rotation. Downy brome is an early season grass and therefore could be used for early spring grazing. Livestock should be removed from downy brome pastures before seed sets to prevent seeds from being transported to native pastures by animals. But it should be noted that an infested downy brome pasture should not be relied upon every year since production will vary. Grazing is not a highly recommended option as it is not always effective, but when combined with another treatment such as herbicide application or burning it does prove to have satisfactory results.

Burning

In some cases, fire as a management tool can be effective in controlling the establishment and spread of downy brome. Burning is a suitable method of control only in areas where downy brome dominates. In locations where downy brome has only partially infested, using fire is not effective. The fire will eliminate other valuable native species that would otherwise provide competition with downy brome. The removal of these native species would only aid in the further dispersal of downy brome as well as other troublesome weeds. Caution should also be taken when using fire as a management tool as downy brome is well adapted to fires and can come back fairly quickly after a fire has burned through an area.

If burning is to be used as a method of management in tame pastures or cropland, it is suggested that the area burned be reseeded to perennial grass. This prevents downy brome and other weedy species from re-establishing. Seeding to perennial grasses allows for more effective competition with downy brome for available soil nutrients and water. Downy brome uses water at shallow depths. Once perennial grasses have established, their roots can penetrate to a depth which is almost free from downy brome competition.

A concern that should be addressed regarding fire as a management option is that all of the downy brome must be eliminated, including the litter. The amount of litter or ash left on a site is a good indication of how many downy brome seedlings are left surviving. All of the litter must be removed, otherwise it can protect the seeds from the fire adding them to the soil seedbank resulting in downy brome re-establishment. Usually burning is best followed by another method of control such as grazing.

MOWING/BURNING AND CHEMICAL CONTROL

Both burning and mowing can be used to encourage even re-growth which can then be treated with herbicides. Herbicides should be applied between the nine to thirteen leaf stage and when the plants are first flowering. For aspen, burning followed by the application of herbicides is very effective in the control of aspen suckers.

Monitoring

It is important to monitor the effects of any treatment being used to control western snowberry or aspen. Depending on the response of these woody species, treatments may need to be adapted from time to time.

It is helpful to record your management actions (timing, location, intensity, plant stage) as well as weather conditions and changes in the plant community. Installing permanent markers at the edge of the snowberry invasion is one way to determine if expansion is being controlled or reduced. Landscape and ground cover photos as well as plant counts may also be useful for monitoring progress. The only way to establish whether or not progress is being made is through continuous monitoring and observation.

SUMMARY

Western snowberry and trembling aspen are native shrub species of North America that have become an economic problem throughout the prairies and aspen parkland. Without natural controls such as fire or free-roaming bison, western snowberry and aspen have encroached into native grasslands, pastures, and rangelands reducing species diversity. The best way to control this encroachment is to use an integrated approach that combines several management techniques. Management strategies for western snowberry and trembling aspen must be persistent and constantly monitored in order to achieve long term results.

FOR FURTHER INFORMATION ON WEEDS AND WEED CONTROL:

- 1. Alberta Invasive Plant Council**
(403) 638-3805; www.invasiveplants.ab.ca
- 2. Alberta Environmentally Sustainable Agriculture**
(780) 427-3885; www.aesa.ca

THANK-YOU!

Many thanks to the Saskatchewan Watershed Authority for donating the text and pictures for these fact sheets.

DESIGN, PRINTING AND DISTRIBUTION MADE POSSIBLE BY:

Government of Canada Habitat Stewardship Program
for Species at Risk
Alberta Conservation Association



Saskatchewan
Watershed
Authority

Canada



Interested landowners are encouraged to contact:

OPERATION GRASSLAND COMMUNITY

Alberta Fish and Game Association

6924 – 104 Street NW

Edmonton, AB T6H 2L7

Phone: (780) 437-2342 Fax: (780) 438-6872

On-line at: www.ogcpcsp.com

7. WESTERN SNOWBERRY in Native Grassland



INTRODUCTION

Western snowberry (*Symphoricarpos occidentalis*), also referred to as buckbrush, badgerbrush or wolfberry, is a native shrub found throughout most of North America. It is a small deciduous shrub that grows in dense stands in pastures and rangeland in the prairies and aspen parkland. Western snowberry is adapted to a wide range of moisture and soil conditions and can be found in open grasslands, riparian areas and on the edges of the aspen parkland. Trembling aspen (*Populus tremuloides*) also referred to as quaking aspen, is native to North America as well. Due to the suppression of fire and bison grazing, and its adaptation to a wide range of soil and moisture conditions, it has started to become a threat to grasslands, mainly in the aspen parkland.

THE PROBLEM

Native prairie is a part of our natural history and is important as a grazing resource, for wildlife habitat, and for soil and water conservation. For thousands of years the open grasslands and woodlands of the prairies have been maintained in a healthy balance by roaming herds of bison and natural disturbances such as fires. Without natural controls to keep populations of woody species in check, our prairie can be degraded as species like western snowberry or trembling aspen exclude other species which reduces biodiversity, carrying capacity, wildlife habitat and the aesthetics of our prairie ecosystem. Western snowberry and trembling aspen have many characteristics that allow them to compete with native grass species:

· Extensive root system:

◇ The rhizomes of western snowberry are usually dense and can grow from 5-12.5 cm deep. Trembling aspen roots can extend a great distance and cover a large area even when the above ground vegetation is sparse.

◇

- **Prolific:**
 - ◊ **Western snowberry reproduces by creeping rhizomes and seed. It re-sprouts rapidly after fire or mowing and often produces fruit in the first growing season.**
 - ◊
- **Suckering:**
 - ◊ **Aspen reproduces primarily through suckering. Suckers are formed on the roots of aspen and are able to produce new stems (also referred to as clones) after some form of disturbance such as fire. These suckers are extremely long lived and can survive for hundreds to thousands of years.**
 - ◊
- **Undesirable to cattle:**
 - ◊ **When given the option, cattle will graze desirable native grass and forb species before they will graze woody species such as aspen or western snowberry. These woody species reduce the availability of herbage thereby causing the desirable grass species to be hit harder by grazers. In fact, western snowberry is unpalatable to cattle throughout most of the season and will not be grazed unless there is little other forage available.**
 - ◊
- **Shading of other desirable species:**
 - ◊ **Both western snowberry and aspen grow to a substantial height, which effectively shades other species resulting in their decreased growth and production.**
 - ◊
- **Dense growth:**
 - ◊ **Stems of western snowberry can grow so dense that it creates a barrier to grazing animals.**
 - ◊
- **Wide adaptation:**
 - **Western snowberry is adapted to a wide range of soil types. It is tolerant of mildly acidic to moderately alkaline soils and is somewhat tolerant of saline soils. Snowberry establishes well on well-drained soils in disturbed areas and on coarse textured or rocky soils. Snowberry grows best in sunny conditions but can tolerate partial shade as well.**
 - **Aspen is also adapted to a wide variety of soils. It can grow on soils that range from shallow and rocky to deep, heavy clays. Generally it grows best on rich, moist, loams or on well-drained silt or clay-loams. Aspen is a shade intolerant species and does not like water logged sites, but it is very tolerant of cool temperatures. Because of their ability to adapt to such a wide range of conditions western snowberry and aspen can easily invade pastures, rangeland and open grasslands.**

KNOW YOUR PROBLEM

Before a management regime for controlling western snowberry and aspen can be selected some important details must be identified: species that are present, area of the encroachment, grazing history, location in relation to the entire pasture, relative biomass of snowberry and/or aspen to native grass species, water sources (above and underground), range condition, topography and soil and range types.

Conducting an inventory of the site using field surveys and aerial photos to gather the necessary information is the first step in controlling aspen and snowberry. Maps of the pasture including total number of acres affected can be created for planning management strategies to control western snowberry invasion.

Controlling Western Snowberry and Trembling Aspen Western snowberry and aspen cannot be controlled with a single treatment. Continuous monitoring and reapplication of the treatment will be required. Producers should be prepared to be active in the control of snowberry and aspen for several years. Management plans should be specific: land use and grazing management of native range, soils, climate, location and topography should all be taken into consideration. The best approach to control western snowberry and aspen invasion is to use an integrated approach using a combination of management techniques. The key to controlling western snowberry and/or aspen is to attack both the above ground growth and the underground root mass and to minimize regrowth as much as possible.

MANAGEMENT TECHNIQUES

Soft Methods

Decreasing overall grazing pressure will increase grass production in the target area while slowing the rate of western snowberry spread. Establish grazing regimes that are beneficial to the desired species. This will result in their increase, which will provide adequate competition with western snowberry. Placing salt blocks in the middle of western snowberry patches to encourage trampling can also help to reduce spread.

Burning

Burning can be an effective method of control, especially if coupled with another management regime such as chemical control or grazing. The safest time of the year to burn is early spring with leftover snow in the brush or trees to act as a firebreak. Fall burning may be more successful because of less ground moisture. However, with the increased dry conditions there is an increased chance of fire escape. It is very important to note, that if burning as a method of control is to be effective, it must be done on a repeated basis. Following first burn, regrowth may appear to be the same if not greater than before the burning, but following subsequent years of burning, regrowth will decrease. For western snowberry, it is recommended that burning take place every spring on an annual basis. For aspen, burning should be conducted at an interval of approximately four years.

Grazing Snowberry

With western snowberry, annual grazing in June or July will provide the most damage. This is when its carbohydrate reserves are lowest and the plant is most vulnerable. Grazing in the late summer or fall should be avoided, as it will only result in a greater snowberry density. In addition, grazing regimes should encourage growth of desirable species. Overgrazing should be avoided, as it will also increase snowberry spread. Although western snowberry is unpalatable to cattle, sheep and goats will graze it and can be used to control its spread.

Aspen

Cattle will graze aspen stands if grazed at the right time of the year. If grazed early in the season, cattle tend to avoid aspen until the herbaceous species have been consumed. Aspen is most acceptable and palatable to cattle when grazed late in the season. Late-season, heavy grazing should occur repeatedly for short durations in subsequent years. This should be a sufficient means to control aspen suckers and improve herbaceous forage production.

Chemical Control

Escort can be used to control western snowberry and will reduce the canopy significantly for at least 6 years. Escort should be applied between mid-June and mid-August after the brush has leafed out but before the leaves begin to turn their fall colors. Escort provides better control than other chemicals such as 2, 4-D because it can translocate into the crown, killing it and it and thus reducing the woody growth and barrier effect the stems have. 2, 4-D applied in the spring can also be used to control western snowberry but somewhat less effectively. It should be applied in spring or early summer when the leaves have fully expanded to increase herbicide take up. Re-treatment will be required the following year. Application of 2, 4-D in combination with Banvel can control both aspen and western snowberry in grass pastures, rangeland, and non-cropland. This should be applied in the spring or early summer when the leaves are fully expanded. For aspen, the chemical should be applied before the canopy reaches a height of two meters and the application will likely have to be repeated. Remedy is another chemical that has been used on aspen. It should be broadcast to fully expanded actively growing foliage also in the spring or early summer. Refer to the “Crop Protection” Guide (the ‘Blue Book’) published annually by Alberta Agriculture, Food and Rural Development. This Features comprehensive and up to date information on application rates and procedures.”

When using chemicals as control, usually target and non-target species end up receiving treatment. Often non-target plants are desirable forbs or grasses that should not be killed. An easy way of avoiding this is to apply chemical using a spot specific applicator such as the carpet wiper or red weeder. Both of these applicators concentrate the chemical solution at the end of a stick or pole, which can easily be wiped onto the brush.

Mowing/Brush Cutting

In order for mowing/brush cutting to be effective in control, it has to be repeated over several years and performed several times per growing season. For western snowberry, mowing should be conducted in the spring just after green-up, again in mid July, and then once again after mid August when it will not grow again for the remainder of the growing season. For aspen, mowing/brush cutting should be done in June to early July after leaf expansion and then once again later in the summer. Mowing early and then again later in the same season works best because it keeps the carbohydrate reserves of the aspen trees low and therefore the suckers are more susceptible to winter kill.

Bark Scraping

For aspen stands, another method of control that has proven to be effective is bark scraping. Bark scrapers are mechanical devices that are pulled over the trees causing the tree to bend over and resulting in part of the bark being peeled off. The best time to scrape is in mid June to the end of July. When compared to other methods such as mowing, fire or grazing, bark scraping appears to be just as effective if not more so.

USING COMBINATIONS OF MANAGEMENT TECHNIQUES

When trying to control and prevent the spread of woody species such as western snowberry and trembling aspen, a combination of management techniques proves to be the most effective when applied at repeated intervals.

Mowing/Burning and Grazing

Both mowing and burning stimulates a much softer re-growth that will be more palatable to cattle. Cattle should not graze areas for the first three to six burns, as hoof rot can result. Usually after the fourth burn cattle can graze the area. The frequency of burning should be decreased when followed by grazing. For aspen control, burning should be followed with short duration, high intensity periods of grazing.

Monitoring

An increase in plant diversity can be observed after a few treatments. Monitoring management regimes will be helpful in determining if management goals and objectives are being met. It is helpful to record your management actions (timing, location, intensity, plant stage) as well as weather conditions and changes in the plant community.

One way to see whether you are keeping smooth brome grass in place or pushing it back is to install permanent markers on the boundary of the smooth brome grass patch. Landscape and ground cover photos may also be useful.

SUMMARY

Smooth brome grass is an extremely competitive species that has invaded and threatens the biodiversity of many native habitats. Management of smooth brome grass should consist of an integrated approach using combinations of treatments to maximize damage to smooth brome grass while minimizing damage to native species and encouraging native species whenever possible. Management programs must be site specific, persistent and consistently monitored and adapted to control smooth brome grass and stop its spread over time.

FOR FURTHER INFORMATION ON WEEDS AND WEED CONTROL:

- 1. Alberta Invasive Plant Council**
(403) 638-3805; www.invasiveplants.ab.ca
- 2. Alberta Environmentally Sustainable Agriculture**
(780) 427-3885; www.aesa.ca

THANK-YOU!

Many thanks to the Saskatchewan Watershed Authority for donating the text and pictures for these fact sheets.

DESIGN, PRINTING AND DISTRIBUTION MADE POSSIBLE BY:

Government of Canada Habitat Stewardship Program
for Species at Risk
Alberta Conservation Association



8. SMOOTH BROME in Native Grassland



INTRODUCTION

Bromus inermis, commonly referred to as smooth brome grass, was introduced to Canada from Eastern Europe. In the last hundred years smooth brome grass has been extensively seeded in pastures, hayfields, and along roadside ditches throughout the United States and Canada. Unfortunately, the very characteristics that make it so effective in producing abundant forage and stabilizing the soil also enables it to invade native grasslands. Smooth brome is a cool season grass that has become a problem in disturbed portions of pastures in the aspen parkland, fescue, and the mixed grass prairie regions. Parcels of native grassland most at risk are those that are idled or located in moist areas. In the mixed grass prairie regions, smooth brome grass invasion is most common in moister areas such as draws, creeks, and wetlands, and is very rarely a problem in upland sites. This vigorous grass is most competitive when it is not grazed, mowed or burned.

THE PROBLEM

Native prairie is a part of our natural history and is important as a grazing resource, wildlife habitat, and for soil and water conservation. With few natural controls in the Canadian Prairies many introduced or exotic species have the ability to invade natural habitats and out-compete the native species. Threats such as the invasion of exotic species can degrade our prairie by excluding native species which reduces biodiversity, carrying capacity, habitat and the aesthetics of our prairie ecosystem. Smooth brome grass has several characteristics which help it out-compete native grass species:

- It begins growth earlier in the spring allowing it to access soil nutrients and available water.
- It is relatively tall and because it starts growth early in the spring it often shades native plants.
- It produces deep roots and a dense mat of rhizomes (underground stems), which compete effectively throughout the season for water and nutrients making it drought resistant.



Interested landowners are encouraged to contact:
OPERATION GRASSLAND COMMUNITY
Alberta Fish and Game Association
6924 – 104 Street NW
Edmonton, AB T6H 2L7
Phone: (780) 437-2342 Fax: (780) 438-6872
On-line at: www.ogcpcsp.com

· **It spreads mainly by rhizomes and somewhat by seeds. One plant can produce 150 to 10,000 viable seeds in one growing season.**



· **The seeds can germinate under a wide variety of soil, moisture and light conditions and can stay viable in the soil for five years.**

KNOW YOUR PROBLEM

Management goals for small to moderate sized stands (two to five meters (8 to 15 feet)) interspersed with native vegetation should focus on the reduction of smooth brome grass growth while increasing the production of native species. The increase in native species will further stress smooth brome grass by adding competitive pressure. Control methods that stress smooth brome grass with minimum damage to native species should be selected (herbicide wicking).

For large brome grass stands (encroachment along a fence line or areas between tame and native fields) that exclude native species management should focus on defoliation of smooth brome grass (dormant season burn) prior to treatment (grazing or herbicide application). Defoliation will stimulate smooth brome grass growth and will focus grazing on smooth brome grass plants increasing the effectiveness of herbicide application.

In Fescue Prairie ecosystems most grass species start growth in early spring close to the same time as smooth brome grass. Management techniques that affect smooth brome grass will also affect native grasses. Management goals should focus on stressing smooth brome grass in mid summer to reduce negative impacts on native species.

CONTROLLING SMOOTH BROME GRASS

Controlling smooth brome grass invasion is a challenge because many of our native plants grow at the same time as smooth brome grass. This indicates that smooth brome grass and many native species are vulnerable at the same time. Successful methods impact smooth brome grass specifically or at least more negatively than native species. Controlling smooth brome grass implies stopping its advance into native prairie and possibly pushing it back over time, by giving native plants the competitive edge.

In most cases, the presence of smooth brome grass is too great, and to try to eradicate it would prove to be not only extremely difficult but impossible in many situations. The solution therefore is to accept its presence and concentrate efforts on its use. Treat large patches of smooth brome grass as one big field and manage for production. The goals should be centered on containing existing populations and preventing its further establishment. For small patches, eradication and control may be more of an option. Small patches in native prairie should be controlled with various patch treatment options such as mowing, grazing or herbicide wicking.

1. Prevention

Prevention of smooth brome grass establishment and invasion reduces the need for years of control. Use management practices such as mowing or grazing to prevent seed production. This will not only decrease smooth brome grass seed in the soil but also prevent the spread of its seeds. Also, by keeping your native prairie in a healthy state, you will decrease the chance of invasion by smooth brome grass. And if seeding land adjacent to native grassland, choose not to use smooth brome grass as part of the seed mix.

2. Consistency

No one treatment will control smooth brome grass. A combination of two or more treatments is required in order to be successful. In addition, treatments need to be repeated over several years.

3. Monitor

Monitoring management regimes will be helpful in determining if management goals and objectives are being met. Document your management regime and its impact over time. This will show progress and the long-term trends. The use of permanent markers (to be used on the boundary of smooth brome grass patches) may prove to be helpful in determining whether the smooth brome grass is staying in place, being pushed back, or further encroaching. Documenting your management action may also be useful such as the timing, location, and intensity of treatments as well as weather conditions and changes in the plant community.

MANAGEMENT TECHNIQUES

No single treatment will control smooth brome. Management is a process of repeated applications, keen observation and modification of management techniques. Timing is best based on plant development as opposed to calendar time. Plant growth is influenced by precipitation, temperature, slope, soil and latitude and thus varies from year to year.

Grazing

Grazing, if done at the right conditions, prevents seed set and weakens smooth brome grass. However, smooth brome must be grazed before the apical meristem (growing points of a plant where new cells are formed such as the tips of the roots or stems) elongates or it could produce an abundance of regrowth after it has been defoliated. During the growing season, cattle and sheep prefer its larger softer leaves when compared to the finer leaves of most native grasses.

In small patches where the goal is to eliminate smooth brome grass as much as possible, the patch should be grazed early (when the stem begins to elongate, usually in early May), allowed to rest for a short time (usually less than 20 days) and then grazed again. It is important that the smooth brome grass is not fall grazed. Smooth brome grass takes on a stemmy appearance in the fall making it unpalatable to cattle. Once this occurs, livestock will select native species over smooth brome grass.

In large patches, the smooth brome should be managed for production. Patches should be kept vegetative and lush, therefore palatable to livestock. This will increase selectivity, decreasing the stress on native plants. Large patches should not be grazed until smooth brome grass is near flowering or seed production (usually mid May) and should only be grazed once a year. This will allow for optimal levels of production of smooth brome grass.

Mowing

In both experimental studies and management experience, a single cutting of smooth brome grass while in the boot stage (flowering heads still enclosed within the sheath) is the most effective method for preventing seed set. It is especially practical for preventing seed production in small areas or patches of smooth brome grass. The best conditions for damaging smooth brome grass are hot, moist weather at the time of cutting followed by a dry period.

Cutting annually for five years or more may also decrease smooth brome grass in the seed bank. Additional summer cuttings will further stress smooth brome grass by keeping carbohydrate levels slightly lower. The more frequent the cutting, the greater the impact.

Prescribed Burning

Prescribed burns can be effective in keeping smooth brome grass from spreading but burning alone will not significantly reduce populations. The best time to burn is when smooth brome grass is in the boot stage (usually late May). This will result in less seed being produced as compared with dormant season burning.

It is also important to note that in order for prescribed burning to be effective, subsequent burns have to take place (ensure that sufficient litter has accumulated so the fire has enough fuel to burn). In fact, burning only once may encourage the growth and dominance of smooth brome grass. The effects on native species have to be considered for growing season burns. Smooth brome grass begins growth in early spring and there may be only a small period of time before native species begin growth (one to two weeks).

Chemical Control

Herbicides may be selectively applied to smooth brome grass by wiping because of the increased height of smooth brome grass as compared to most native species. In the process of wiping, herbicide is applied only where the applicator contacts the plant. Although only a small part of the plant receives herbicide, the concentrated solution (33 percent glyphosate) will kill the entire plant stem.

Herbicides should be wiped when the height difference between smooth brome grass and native grasses is greatest. This is generally when smooth brome grass stems have elongated or are in early boot stage. When smooth brome grass stems are elongating, there is also greater movement of the herbicide to the roots.

Application using a hand held wiper (e.g. Red Weeder), which looks like a hollow hockey stick, is ideal for small patches. Larger areas may be treated using a wiper mounted on an all terrain vehicle or tractor. The wiper is set at a specific height so that only plant material above that height, in this case smooth brome grass, is contacted and the shorter native plants are not touched. Machine application may not be appropriate for rough land.

This method of application will not eliminate smooth brome grass entirely because not all smooth brome grass stems will be tall enough to be contacted. Smooth brome grass will increase over time if other actions, such as a follow-up herbicide application are not taken. This method should however, give a competitive edge to the native species in the short term and reduce the rate of spread of smooth brome grass.

**USING COMBINATIONS OF MANAGEMENT TECHNIQUES
Burning and Grazing**

A burn when smooth brome grass is in the boot stage followed by cattle grazing of the re-growth may dramatically reduce smooth brome grass and provide excellent weight gains for livestock. Do not use this approach where shrubs are a problem: cattle will graze relatively little of the shrub growth when lush grass growth is available. As a consequence, grass competition is severely reduced and shrub growth may increase.

Dormant season burns combined with grazing may also be effective in controlling smooth brome grass expansion. Smooth brome grass growth will be increased and grazing will be focused on smooth brome grass.

Burning/Grazing/Mowing and Chemical Control

The use of grazing, mowing, or burning prior to herbicide wicking may increase herbicide effectiveness. Grazing or mowing in the growing season may stimulate growth so that more stems are present to receive herbicide. For example, in the spring a smooth brome grass patch may be mowed to stimulate tillering (tiller production), in the summer the same patch may be grazed, and then in the fall any emerging tillers (an erect shoot located at the base of a plant) on that patch can then be spot sprayed.

The use of burning prior to herbicide wicking may increase herbicide effectiveness. An early spring burn removes litter and stimulates growth, thereby increasing the height difference and the area to which herbicide may be applied. Spring burning followed by application of a herbicide such as Glyphosate will provide excellent control but may damage native species if not applied properly. Fall burning can be done but is less effective as native species will not recover as quickly and the loss of vegetation will reduce snow trapping in the winter resulting in drier soil condition and reduced vegetative growth in the spring.