

access

VEGETATION
MANAGEMENT
NEWS

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SPREAD THE WORD, NOT THE WEEDS.

One thing that came across loud and clear at the 2008 *Weeds Across Borders* conference held in Banff, Alberta earlier this spring is that invasive weeds have no respect for geographic boundaries. Travel, trade, transport and tourism are all contributing factors that are increasing the spread of invasive alien species. There is also a possible link between climate change and weed growth.

So what can be done? Judicious use of herbicides is proving to be a safe, effective means of control. In this issue of *Access*, we look at Garlon Ultra – the new formulation that is effective yet has a low impact on the environment. Of course, Milestone* is a product that is being used across the country with excellent results. The County of Simcoe and Canadian Pacific are using it in their vegetation management plans and seeing good results.

Early detection and rapid response are essential if we are going to get control of invasive and noxious weeds. Weed containment is a strategy employed by the British Columbia Ministry of Forests and Range that is proving to be effective.

It is in all of our best interests to take a proactive role in managing invasive weeds. Economically, ecologically and environmentally, there is a cost associated with ignoring the problem. There is no time to waste. With education and effective solutions, we can put strategies in place to make sure that we stop the weeds before they move further.

Thanks.

Mark Woloshyn
Marketing Manager
Dow AgroSciences

**TOUGH ON WEEDS.
GENTLE ON YOUR MIND.**





VEGETATION MANAGEMENT KEEPS THE TRAINS RUNNING ON TIME

Canadian Pacific's innovative management program delivers safe, effective and cost efficient control.

When it comes to managing weeds and vegetation, David Spata faces a formidable challenge. As the manager of Canadian Pacific's (CP's) vegetation program, he is responsible for a network of over 21,000 kms of rail lines that run across Canada and the U.S.

"Vegetation control is essential for safe track maintenance," says Spata. "Left unattended, vegetation can cause the track to shift and that can lead to derailments."

With safety as its top priority, CP's management program focuses on two specific areas: rights of way/crossings and ballast, which are the rocks that underlie the track.

"For rights of way management, we work to eliminate those species that obstruct signals and become a safety hazard" he says. "We also focus on noxious and invasive plants that threaten the environment and agriculture."

CP's rights of way initiative known as the Crossing Sideline Improvement Program won the Railway Association of Canada's Environment Award in 2007 in recognition of CP's efforts to improve vegetation control around the highway-railway crossings.

"This is a systematic program started in 2006 where 1,000 crossings were treated with Tordon* 101 and the plan is to target approximately 25 per cent of our crossings each year," explains Spata. "The goal is to encourage species that are self-sustaining and don't require a lot of management over the long haul."



In areas where there is a large mix of undesirable plants, cutting and treating stumps with herbicides and spot application of select herbicides is being used. For environmentally sensitive areas, cutting and treating stumps with Garlon minimizes the impact of herbicides. By making the transition to low-growing plant life, habitat disturbance and the amount of maintenance required is reduced.

Ballast management presents more of a challenge because the tracks have to be completely weed free. Any species from tall weeds to grass will obstruct visibility for inspection, impede drainage or create a fire hazard.

CP's integrated vegetation management program incorporates targeted herbicide applications along with mechanical and preventative maintenance. For the ballast sections, CP incorporates Weed Seeker technology which is a unique camera system mounted on a spray truck.

"The system looks for chlorophyll in the rock section and when it detects a

plant, it turns the nozzle on and spot sprays the weed," he says. "Because it's not a blanket spray system, we save money on herbicides and we don't load up the environment with more herbicides than needed. It's really a win/win situation."

Trucks are GPS-equipped which makes application post-treatment audits much easier as well, providing recorded evidence of environmental compliance should challenges arise. As well, trucks are now equipped with injection systems that have individual pods which allow the operator to deliver customized applications based on the species being controlled. This means that the correct herbicide is used on an area for the species present, and at the application rate required for optimal control.

"While we are pioneers in the railway sector, most of the ideas have come from the agricultural sector. We just find a way to adapt them to our circumstances," says Spata.

HOLDING THE LINE ON INVASIVE WEEDS



British Columbia's Northwest Invasive Plant Council's systematic approach is not only preventing weeds from spreading, but in some cases is pushing them back.

Bob Drinkwater, the Invasive Plant Specialist for Northern BC (BC Ministry of Forests and Range) has been using containment lines for over 30 years to hold back the spread of invasive species, specifically knapweed.

But it has only been in the last four years in his work with the Northwest Invasive Plant Council and Northeast



Invasive Plant Committee that he has seen a concerted effort focused on containing and pushing back specific weeds through an integrated, systematic approach.

Two weeds in particular – marsh (plume) thistle and field scabious – were the first weeds chosen as part of a pilot project launched in 2004 that focused on using an integrated single agency delivery model approach to weed management. These weeds were selected because the only large infestations in the province happened to be in the jurisdiction of the Northwest Invasive Plant Council, an area that covers approximately 40 million hectares west of the Rocky Mountains to the Pacific Ocean including the Queen Charlotte Islands and north of Quesnel to the Yukon border.

Both weeds pose a significant threat to BC resources. Marsh thistle grows very tall, 1.2 to 2.4 metres, and the rosettes can form continuous mats preventing germination and limiting growth of other plants. Marsh thistle, which is considered very aggressive, presents a serious threat to riparian, upland and seral plant communities. It may also impact regeneration of conifer stands. Spread is primarily by windblown seed.

A field scabious or blue buttons plant can produce up to 2000 seeds which may remain viable in the soil for many years. The tap rooted woody rootstocks are often branched just below the surface of the soil. Plants establish easily along

roadsides, in pastures, meadows and idle areas. Field scabious prefers loose, loam soils that are nutrient rich and moderately moist to dry. This rapidly spreading weed is very competitive with forage stands and native pastures. Infestations result in significant declines in hay production and pasture carrying capacity.

Weed management in the Council's seven invasive plant management areas is done by the Northwest Invasive Plant Council through contractors in each area. Agencies and partners contribute money to a funding pool and work is undertaken based on a shared strategic plan rather than jurisdiction. Weeds are categorized into four groups – extremely invasive, very invasive, invasive and aggressive or under biocontrol. Sites are ranked in priority – extremely high opportunity for control, high opportunity for control, moderate opportunity for control and low opportunity for control. The council also integrates weed awareness programs with a hotline for weed reporting linked to the treatment contractors.

"So now contractors can manage the area based on the strategy – highest weed priority, highest site priority – and they don't have to worry about overstepping jurisdiction or boundary lines," says Drinkwater.

Obviously, it's important to know exactly where the weeds are before you can contain them. That's where the Invasive Alien Plant Program (IAPP) has proven to be an invaluable resource.



MILESTONE DELIVERS EFFECTIVE WEED CONTROL AND GOODWILL

"The province of British Columbia and its partners use IAPP, which is a web-based data management inventory to co-ordinate and share information generated by various agencies and non-government organizations involved in invasive plant management," says Drinkwater.

The first step for containment is to get consensus among the various agencies and partners – utilities, agriculture, railways, timber companies, municipalities, Regional Districts, the Provincial Government, First Nations and others. All must agree that the weed should be contained and where the containment line should be applied. Weed programs operate using an integrated pest management approach and the contractor prescribes site-specific treatments.

"Once the containment lines were established, anytime those two species were found outside the specified line, treatment would be mandatory within 72 hours," he says. "For field scabious there were three large infestations in the north and two for marsh thistle."

Since employing a formalized containment approach, one of the marsh thistle containment lines is coming down as well as one of the field scabious lines.

"Even though these lines have been used for many years, by taking a formalized, systematic approach, we've accomplished more than we expected to," Drinkwater says. "It looks like we are going to be able to eradicate these species from large portions of the province."

For more information, check out the Northwest Invasive Plant Council's web site <http://www.nwipc.org/index.php>, the BC Government's Invasive Plant Program <http://www.for.gov.bc.ca/hra/Plants/index.htm> and the Invasive Plant Council of BC

Located north of Toronto, the County of Simcoe has 850 km of roadsides and over 31,000 acres of county forests that need protection from invasive and noxious weeds.

Murray Lockhart and Brent Price, Municipal Law Enforcement Officers, say that Milestone is just what they've been looking for to keep the roadsides clean.

"We've used Milestone for three years now in our moderated spray program," says Lockhart. "Even in the areas where we've got a late start, we're still seeing good results."

Milestone combines strong value with a soft environmental footprint. This new generation reduced-risk herbicide provides extended control of difficult-to-handle invasive broadleaf weeds. The mix of Milestone's high effectiveness at low rates and its lower cost per treated acre takes the worry out of managing most annual and perennial weeds.

"Lower use rates and low residual mean a lot to the people in our community when we are explaining how we control weeds," Price says.



Murray Lockhart (left) and Brent Price, Municipal Law Enforcement Officers, County of Simcoe.

Simcoe County Forests encompass over 31,000 acres, the largest municipally-owned forest system in southern Ontario with tracts ranging in size from seven to more than 3,500 acres that are distributed throughout the County.

"We are starting to see invasive species like giant hogweed and Japanese knotweed making their way into the coniferous forests," says Lockhart. "We've set up a test strip to see how Milestone can handle these weeds and so far we've seen good results with the product."





GARLON ULTRA – THE EVOLUTION OF IVM

With its new formulation, Garlon* Ultra maintains the hardworking reputation that defines Garlon* 4 and it does it without the odour.

“What makes Garlon Ultra different from Garlon 4 is that the carrier is methylated seed oil instead of kerosene,” explains Ross May, Vegetation Management Specialist with Dow AgroSciences. “So the only difference applicators will notice is that it’s easier to handle without the odour.”

The active ingredient in Garlon Ultra is triclopyr BE ester (triclopyr), which is a plant growth regulator that mimics growth hormones found exclusively in plants. When applied to leaves and stems, triclopyr uses the plant’s own water and nutrient transportation system to move into the leaves and roots. It then initiates rapid mature cell growth, which causes the cell walls to rupture. This hinders the plant’s ability to move food and use energy from the leaves, causing the plant to die.



APPLICATION TIPS

If Garlon Ultra is applied as a foliar spray, it will achieve maximum effectiveness after full leaf development when soil moisture is adequate for normal plant growth and prior to autumn colouration of leaves.

A basal bark application of Garlon Ultra will provide effective control of brush that can be applied at any time of the year provided there is no moisture or frost present on the stems.

“Applicators should be aware that if they are applying Garlon Ultra in temperatures less than -10°C they will need to make sure that they agitate the mixture well as it will begin to congeal in colder temperatures,” advises May.

For cut stump applications, apply Garlon Ultra to the stump’s surface and the remaining bark to the ground line, including the root collar and root flares to prevent re-sprouting.

ENVIRONMENTAL PROFILE

Garlon Ultra is non-residual in the soil with an average half-life of 30 – 46 days. Final breakdown products are carbon dioxide, water and organic acids giving it a favourable environmental profile. If Garlon Ultra inadvertently reaches water, it dissipates through a variety of environmental processes that collectively remove it very rapidly.

“Like all of our products, Garlon Ultra is one that applicators can use with confidence,” says May. “It’s really one more example of how we are continually working to improve our products to have a low impact on the environment.”

PRODUCT FEATURES

- Broad spectrum control of deciduous brush and broadleaf weeds
- Control of the entire plant down to the root
- Fast visual evidence of activity
- Low environmental impact

VEGETATION CONTROLLED

Garlon Ultra is registered for control of the following:

Woody plants:

Alder, ash, aspen, basswood, beech, birch, blackberry, buckthorn, cherry[†], chokecherry[†], cottonwood, dogwood, elderberry, elm[†], hawthorn, hickory, hop-hornbeam, honey locust[†], locust, maples, mulberry, oaks[†], poison oak, pines[†], poplar, red maple[†], raspberry[†], sassafras, sumac, sycamore, tamarack, wild rose, willow, witch hazel.

Broadleaf weeds:

Burdock, chicory, curled dock, dandelion, field bindweed, lamb’s-quarters, ragweed, smartweed, smooth bedstraw, vetch, wild lettuce.

[†]Higher rates recommended to minimize a possible need to retreat the following year. See label for detailed rates and directions for application.

WEEDS TO WATCH OUT FOR

YELLOW STARHISTLE

(*Centaurea solstitialis*)



- Flowers have sharp, straw-coloured spines, up to five cm long, surrounding the base and radiating in a star shape. Stems are rigid and appear winged due to extending leaf bases. The stems of yellow starthistle are covered with cottony hairs giving a whitish appearance. Mature plants are usually one metre tall.
- Yellow star-thistle has the same toxic effect on horses as Russian knapweed, which is more toxic. Chewing disease becomes incurable once clinical signs are present.

Habitat and impacts

- Yellow starthistle favours disturbed sites like roadsides, ditches, waste areas, and overgrazed rangeland. When site conditions are ideal, this plant can invade excellent condition rangelands.
- Starthistle requires at least 25 cm of annual precipitation that peaks in winter or spring. This plant will establish on deep, well-drained soils and shallow, rocky soils. Yellow starthistle does not tolerate shade. It requires light on the soil surface for rosette and taproot development.
- A serious invader, the plant infests over four million hectares in California and occupies large areas in Idaho, Oregon, and Washington. Starthistle appears to be moving north and eastward from British Columbia to Ontario.

Biology and spread

- A winter annual with a deep taproot, Yellow starthistle is a rapid colonizer. It germinates quickly under most

conditions. Seeds germinate in the fall and overwinter as seedlings. Rosettes form during early spring and bolt during late spring. The plants flower and produce seeds in June through August, and then lose their leaves and dry in early fall.

- With fall rains, seeds begin germination and the cycle is repeated. Seedbank development and a long seed life make this plant extremely difficult to control. It is important to locate new invasions prior to reproduction and seedbank development.

LEAFY SPURGE

(*Euphorbia esula*)



- An extremely aggressive, long-lived, rhizomatous perennial. Flowers are yellowish-green and arranged in numerous small clusters, subtended by paired, heart-shaped yellow-green bracts that are often mistaken for flowers.
- Leaves are narrow and alternate on the stem. The leaves and stems are smooth, hairless and pale green or blue-green in colour. The entire plant contains white, milky latex which is toxic to most native herbivores including deer, elk and antelope. Mature plants can reach up to 1.2 metres.

Habitat and impacts

- Leafy spurge reproduces by vegetative shoots and seeds. It primarily reproduces vegetatively with an extensive lateral root system that is capable of producing adventitious buds. Roots can spread laterally five metres per year and reach nearly nine metres in depth. The extensive root system of leafy spurge stores large nutrient reserves that can sustain the

plant for years, enabling it to survive drought, grazing stress, and herbicide treatments. It is important to eradicate new invasions early before mature root systems develop.

- Flowering generally begins during mid-June and ends in mid-July. Plants flower throughout the summer and fall and produce seeds until frost. Most seed production is completed by mid-August. A large plant can produce up to 130,000 seeds that remain viable in the soil seven years or longer. Seed capsules “explode” at maturity and project seeds up to five metres from the parent plant. Germination can occur any time adequate moisture is available.
- Seeds are dispersed along roads, railways, and waterways and can be transported by water, wildlife, livestock, agriculture and construction equipment. Seeds are also dispersed to new sites in mud on boots and impure materials like mulch, forage and feed grains, crop and grass seed, top soil, and gravel. New infestations can also originate from vegetative buds on root pieces transported by equipment.

PURPLE LOOSESTRIFE

(*Lyrumth salicaria*)



- Plants are one or two metres tall with smooth-edged leaves on a four-sided square stalk. There are several stalks per plant. The flowers bloom from June to September on long, pink/purple spikes.

Habitat and Impacts

- An invasive, weedy species, loosestrife readily establishes in a variety of urban and rural wetland habitats. Once present, it has a tendency to dominate, out-competing native vegetation.

WEEDS COULD BENEFIT FROM CLIMATE CHANGE

- The displacement of native vegetation by purple loosestrife has far reaching ecological implications, many of which still remain unknown. In urban areas, loosestrife commonly takes hold in ditches and can block or disrupt water flow. In agricultural regions it can clog irrigation canals and reduces the value of forage.

Biology and Spread

- Each purple loosestrife plant is capable of producing an enormous number of seeds, up to three million every year. The seeds are small, light and are easily dispersed by the wind, which carries them great distances. In addition, loosestrife seeds have high viability, an almost 100 per cent germination rate and remain viable after many years in the soil or submerged under water.
- Purple loosestrife can also spread vegetatively, by pieces of the stems or roots. Garden varieties of loosestrife can also exchange pollen with other loosestrife cultivars and wild populations. Garden seeds can be transported by animals, on clothing or vehicles and rainfall carries them into river systems and wetlands through storm water run-off.
- Once established, it is extremely difficult to eradicate. No herbicides are currently approved to control loosestrife growing in or near waterways. Small outbreaks can be removed by hand digging, but for large scale infestations this is too costly and time consuming. Since purple loosestrife can regenerate from even the smallest piece of root tissue left in the soil, digging is not a viable long term solution.

Not only will climate change have an effect on growing seasons, researchers believe it will also have a direct impact on weeds.

Dr. Lewis Ziska is with the Agriculture Research Service branch of the United States Department of Agriculture. In a recent presentation at the *Weeds Across Borders* conference in Banff, AB, Ziska outlined the potential effects increased temperatures and carbon dioxide levels will have on invasive weeds based on research he has conducted.

“Increasing temperatures may mean an expansion of weeds into higher latitudes or higher altitudes,” he explains. “Very aggressive weeds found in the south are limited in the northern states by lower temperatures but a warming trend of only three degrees could extend their limits by several hundred miles.”

The growth of Kudzu, the creeping vine commonly found in the southeastern United States, is limited by low winter temperatures but it is now found making its way as far north as Ohio. Estimates predict that it could be in Ontario in 20 years.

“Witchweed, a root parasite of corn, is limited at this time to the coastal plain of North and South Carolina,” says Ziska. “An increase of temperature of three degrees could allow this parasite to become established in the Corn Belt with disastrous results.”

Chemical management of weeds may also be adversely affected. Studies show a decline in chemical efficacy with rising CO₂; however, the reasons behind the decline are unclear.

“Recent work with Canada thistle grown in monoculture under field conditions suggested a greater root to shoot ratio and subsequent dilution effect of



glyphosate when grown at an elevated CO₂ level. If rising CO₂ does indeed reduce efficacy, then additional work is needed to determine herbicide specificity, concentration and application rates as a possible means of adaptation.”

Mechanical removal of weeds in an era of climate change also presents challenges.

According to Ziska, elevated CO₂ could lead to further below ground storage with subsequent increases in the growth of roots and rhizomes, particularly in perennial weeds.

“Consequently, mechanical tillage may lead to additional plant propagation in a higher CO₂ environment with increased asexual reproduction from below ground structures and negative effects on weed control.”

Ziska says that if an increase in CO₂ and temperatures allow invasive weed species to increase geographical locations, new herbicides may be needed to combat them.

“Very little is known regarding the impact of these environmental changes on either the reproductive success of...invasive weeds and the potential consequences for their management,” he says. “Yet given what is known, it is clear that the agricultural, environmental and health costs of not understanding the impact of rising CO₂ and climate change on weed biology may be substantial.”

More information is available at www.climateandfarming.org

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Milestone* provides exceptional weed control and value with a soft environmental footprint – an unbeatable combination for vegetation managers. This new generation, reduced-risk herbicide gives you extended control of difficult-to-handle invasive broadleaf weeds. The mix of Milestone's high effectiveness at low rates and its lower cost per treated acre takes the worry out of managing annual and perennial weeds such as Canada thistle, knapweed, absinth wormwood, scentless chamomile and many more.

So go ahead, apply less herbicide and eliminate buffer zones around sensitive terrestrial habitats. With Milestone, you'll get tough on weeds – without the worry.