Vegetation Management Guide

Create a site to behold.

BASF

We create chemistry

Up against tough vegetation? Together, we'll manage.

Managing vegetation is no easy task.
Not only does it speed up operational efficiency,
it also ensures public and worker safety.
That's why BASF produces some of Canada's
leading vegetation management solutions for
industrial bareground, railroad, roadside,
pasture and rangeland applications.
From controlling tough weeds to managing key
brush species, you'll find a solution that works for you.

Turn the page and explore what our
vegetation management products have to offer.

Arsenal® Powerline

Herbicide

Residual control of grasses and broadleaf weeds in an easy-to-use liquid formulation.

- Uses Transport Technology to ensure rapid absorption and translocation of the active ingredient throughout the target plant
- Proven, consistent control of key brush species along with effective burndown and residual control of grass and broadleaf weeds
- Can be used for selective control of invasive plants

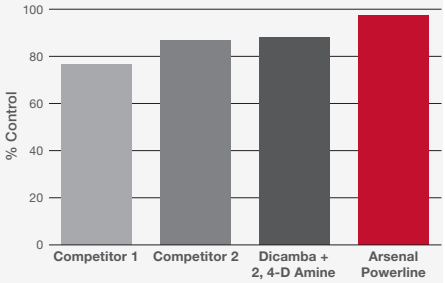
Active ingredient
Imazapyr – Group 2

Formulation
Liquid

One case contains
2 x 9.5 L jugs

Storage
Store above -12°C.

Brush control:
1 year after application



Source: BASF Trials, Tantallon, NS

How it works

Arsenal® Powerline inhibits an essential enzyme found only in plants, making it safe for applicators, wildlife and the general public. Using Transport Technology, Arsenal Powerline is quickly absorbed through plant foliage and roots, stopping the development of new growth. It also translocates throughout the plant and into the roots, preventing re-growth in subsequent years.

Because Arsenal Powerline stops new growth, fully developed brush species and established invasive perennial plants (e.g. dog-strangling vine) may not demonstrate symptoms until the following spring.

Weeds controlled

Apply to actively growing weeds.

Annual broadleafs

Black medic, cinquefoil (rough), fleabane[1], groundsel (common), hemp-nettle[2], kochia[2], lamb's quarters[2], mustard[1,2], pigweed[1,2], pineappleweed, ragweed[1], Russian thistle[2], stinkweed, sow thistle (annual)[2], wild buckwheat[2]

Perennial/biennial broadleafs

Bladder campion, bull thistle, burdock, Canada thistle[2], cinquefoil (sulphur), clover[1], dandelion, dog-strangling vine, field bindweed, goat's beard, goldenrod, leafy spurge, milkweed, mouse-ear chickweed, mullein[1], ox-eye daisy, phragmites (non-aquatic areas), plantain[1], poison ivy, reedgrass, sheep sorrel, toadflax, tufted vetch, wild carrot, wild grape, wild strawberry

Annual grasses

Bluegrass (annual), foxtail[2], old witchgrass

Perennial grasses and sedge

Bluegrass (Canada), bromegrass, fescue[2], quackgrass, yellow nutsedge

Brush

Maple, poplar, raspberry, wild rose

See label for additional weeds controlled.

[1] Controls multiple species of the targeted weed.

[2] Tank mix with another herbicide active against the target weed for control of Group 2-resistant biotypes.

Environment, health and safety

General information

Combustibility:	Non-combustible
Regulation:	Not regulated by TDG or WHMIS
Toxicity:	Low (Signal Word: Caution)
Re-entry interval:	Once spray residue has dried

User toxicology

Oral LD_{50}:	>2,000 mg/kg
Dermal LC_{50}:	>5,000 mg/kg
Skin irritant:	Mildly irritating
Eye irritant:	Moderately irritating
Bioaccumulation:	No
Carcinogenic:	Non-carcinogenic
Mutagenic:	Non-mutagenic

Ecotoxicity

Birds:	Practically non-toxic (oral LD_{50} > 2,150 mg/kg)
Fish:	Practically non-toxic to slightly toxic (96 hour LC_{50} > 120 mg/L)
Aquatic insects:	Practically non-toxic to slightly toxic (48 hour EC_{50} > 100 mg/L)

Environmental fate

Volatility:	Non-volatile
Persistence:	Breakdown by soil microbes is dependent on moisture and temperature. Low temperatures and dry conditions will extend persistence.
Erosion:	Arsenal Powerline binds tightly to soil and will move with eroded soils.
Leaching:	Will not move deeper than 15 cm in the soil profile. Does not move laterally in the soil profile.
Buffer zones:	Leave an adequate buffer zone between spraying area and sensitive vegetation. Refer to label for information.
Grazing restrictions:	No grazing restrictions. Do not cut forage for hay for 7 days after application.

Handling precautions

Read Arsenal Powerline label before using.

Use goggles, gloves and coveralls when mixing.

Wash thoroughly after using. Launder clothes separately.

First aid

Eye contact:	Flush with water for 15 to 20 minutes
Skin contact:	Wash with soap and water
Inhalation:	Remove to fresh air
Ingestion:	Drink water, induce vomiting and seek immediate medical attention

Call 1-800-454-2673 for 24-hour assistance.

For more information

Visit **www.BetterVM.ca**.

Banvel® VM

Herbicide

Tried and trusted formulation for effective brush and broadleaf-weed control.

- Proven, broad-spectrum control of coniferous and deciduous brush species
- Effective burndown and residual control of annual and perennial broadleaf weeds
- Rapid uptake by roots and shoots
- Low volatility formulation designed for industrial non-crop areas, pastures and rangeland

Active ingredient
Dicamba – Group 4

Formulation
Solution

One case contains
2 x 10 L jugs

Storage
Keep dry and store away from other pesticides, fertilizers, food or feed.

Effective burndown and residual control

Untreated control

Banvel VM (2 L/ha)

Source: BASF Canada, SK

How it works

Banvel® VM is a selective brush and broadleaf herbicide. Rapidly taken up by roots and foliage, Banvel VM moves quickly throughout the entire plant. It mimics the plants' own auxins, a group of naturally occuring hormones crucial to plant development and growth, resulting in uncontrolled cell division, irregular growth and finally weed death.

Weeds controlled

Brush[1]

Alder, aspen poplar, balsam fir, balsam poplar, basswood, birch, black cottonwood, bur oak, cherry, elm, hickory, pine, prickly rose, red oak, spruce, sugar maple, tamarack, vine maple, western snowberry, white ash, white birch, white cedar, wild rose, willow, wolf willow

Broadleafs

Absinthe[2], Canada thistle, common ragweed, curled dock[2], diffuse knapweed, English daisy, field bindweed, giant ragweed, goat's beard, goldenrod, ground cherry, kochia[1], leafy spurge[2], pasture sage, perennial sow thistle, poison ivy[1], poverty weed, Russian thistle[1], scentless chamomile[2], sheep sorrel, tansy ragwort, thyme-leafed spurge, wild carrot[1]

Apply to actively growing weeds.

[1] Must be tank-mixed with 2,4-D amine or low volatility ester. See label for rates.

[2] Top growth control only.

Environment, health and safety

General information

Combustibility:	Non-combustible
Regulation:	Not regulated by TDG or WHMIS
Toxicity:	Low (Signal Word: Caution)
Re-entry interval:	Once spray residue has dried. 12 hours after application for pasture or rangeland.

User toxicology

Oral LD_{50}:	3,512 mg/kg
Dermal LC_{50}:	>2,000 mg/kg
Skin irritant:	Mildly irritating
Eye irritant:	Moderate but temporarily irritating
Bioaccumulation:	No
Carcinogenic:	Non-carcinogenic
Mutagenic:	Non-mutagenic

Ecotoxicity

Birds:	Practically non-toxic (LD_{50} > 5,632 mg/kg)
Fish:	Practically non-toxic to slightly toxic (LC_{50} > 100 mg/L)
Aquatic insects:	Practically non-toxic to slightly toxic (EC_{50} > 1,000 mg/L)

Environmental fate

Volatility:	Moderate. Because dicamba is present as diglycolamine salt, Banvel VM is less volatile than some other dicamba formulations.
Persistence:	Half-life in soil is 1 to 4 weeks (typically 2 weeks).
Erosion:	The potential for movement of dicamba on eroded soil is low.
Leaching:	Dicamba can leach through sandy soils or where the water table is shallow.
Run-off:	The potential for movement of dicamba through surface run-off is high.
Buffer zones:	Leave an adequate downwind buffer zone to sensitive plants. Refer to label for information.
Grazing restrictions:	**Do not** permit lactating dairy animals to graze fields within 7 days after application. **Do not** harvest forage or cut hay within 30 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Handling precautions

Read Banvel VM label before using.

Use goggles, gloves and coveralls when mixing.

Wash thoroughly after using. Launder clothes separately.

First aid

Eye contact:	Flush with water for 15 to 20 minutes
Skin contact:	Wash with soap and water
Inhalation:	Remove to fresh air and seek immediate medical attention
Ingestion:	Sip water, **do not** induce vomiting and seek immediate medical attention

Call 1-800-454-2673 for 24-hour assistance.

For more information

Visit **www.BetterVM.ca**.

Banvel® VM
Herbicide

Detail™

Herbicide

Provides quick and complete burndown as well as residual control of Group 2-, 4- and glyphosate-resistant kochia and other tough-to-control broadleaf weeds.

- Offers versatile results when tank mixed with Arsenal® Powerline or glyphosate
- Applicator-friendly liquid formulation that provides convenient handling and mixing
- New mode of action means fast, effective and lasting results on tough-to-control weeds

Active ingredients

Saflufenacil – Group 14

Formulation

Suspension concentrate

One case contains

4 x 1.38L jugs

Storage

Store in cool, secure, ventilated area, away from food or feed.

Detail + Arsenal Powerline
8 weeks after application timing

Source: BASF Canada, Swift Current, SK

Detail + glyphosate
8 weeks after application timing

Source: BASF Canada, Acheson, AB

How it works:

Detail™ is a potent inhibitor of an enzyme that supports the production of chlorophyll and heme, which are essential to plant survival. Detail not only inhibits this enzyme, it also causes highly reactive molecules to be formed that attack and destroy lipid and protein membranes. When a lipid membrane is destroyed, the cell becomes leaky and cell organelles dry and disintegrate rapidly.

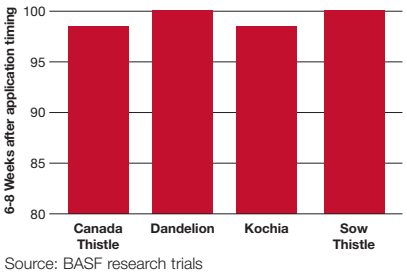
Susceptible weeds develop injury symptoms within hours of application under active growing conditions; plant death occurs within 3 to 5 days depending upon growing conditions. Larger, established weeds may require more time for complete death to occur.

Weeds controlled

Broadleafs

Canada thistle[1]
Common chickweed
Common cocklebur
Common groundsel
Common mallow
Common purslane
Common sunflower
Cowcockle
Dandelion[1]
Field bindweed[1]
Fleabane (Canada, hairy)
Flixweed
Henbit
Kochia[2]
Lady's thumb
Lamb's quarters
Morningglory
(entireleaf, ivyleaf, pitted, tall)
Mustard (tumble, wild)
Nightshade
(black, cutleaf, eastern black, hairy)
Pennsylvania smartweed
Perennial sow thistle[3]
Pigweed (prostrate, redroot, smooth)
Prickly lettuce[3]
Prostrate knotweed
Ragweed (common, giant)
Russian thistle
Shepherd's-purse
Sow thistle (annual and spiny)
Stinkweed
Velvetleaf
Volunteer canola
Wild buckwheat

Detail tank-mixed with Arsenal Powerline provides exceptional results



Source: BASF research trials

[1] Control of seedling stage and suppression of perennial growth stage. [2] Including Group 2-resistant biotypes and Group 9-resistant biotypes. [3] Top growth burn down control.

Environment, health and safety

General information

Combustibility:	Non-combustible
Regulation:	Not regulated by TDG
Toxicity:	Low (Signal Word: Caution)
Re-entry interval:	Once spray residue has dried

User toxicology

Oral LD_{50}:	>2,000 mg/kg
Dermal LC_{50}:	>5,000 mg/kg
Skin irritant:	Non-irritating
Eye irritant:	Non-irritating
Bioaccumulation:	No
Carcinogenic:	Non-carcinogenic
Mutagenic:	Non-mutagenic

Ecotoxicity

Fish:	High probability that the product is not acutely harmful (96 hour LC_{50} > 96.8 mg/L)
Aquatic insects:	High probability that the product is not acutely harmful (96 hour EC_{50} 8.0 mg/L)

Environmental fate

Volatility:	Non-volatile
Persistence:	Breakdown by soil microbes is dependent on moisture and temperature. Low temperatures and dry conditions will extend persistence. Not readily biodegradable.
Erosion:	Following exposure to soil, the product trickles away and can – dependent on degradation – be transported to deeper soil areas with larger water loads.
Leaching:	Not tested.
Buffer zones:	Leave an adequate buffer zone between spraying and sensitive vegetation. Refer to label for information.
Grazing restrictions:	No grazing restrictions.

Handling precautions

Read Detail label before using.

Use goggles, gloves and coveralls when mixing/loading.

Wash thoroughly after using. Launder clothes separately.

First aid

Eye contact:	Flush with water for at least 15 minutes
Skin contact:	Wash with soap and water
Inhalation:	Remove to fresh air
Ingestion:	Rinse mouth and drink water, **do not** induce vomiting and seek medical attention

Call 1-800-454-2673 for 24-hour assistance.

For more information

Visit **www.BetterVM.ca**.

Overdrive®

Herbicide

Fast-acting, broadleaf weed control without the strong odour.

- Post-emergent control of annual, perennial and biennial broadleaf weeds
- Two modes of action to manage biotypes resistant to glyphosate and Group 2 chemistries
- Low rate, low odour formulation
- For use on bareground, pasture, rangeland and non-crop areas

Active ingredients

Diflufenzopyr – Group 19
Dicamba – Group 4

Formulation

Wettable granules

One case contains

4 x 3.4 kg jugs

Storage

Store in cool, dry place away from food or feed.

How it works

Overdrive® works through two distinct modes of action:

- It mimics the plant's own auxins, a group of naturally occurring hormones crucial to plant development and growth that result in uncontrolled cell division and growth
- It inhibits the distribution of natural and synthetic auxins, causing them to accumulate in the weeds' key growing points (e.g. roots and shoot growth areas) and leading to abnormal, uncontrolled growth and effective weed control

Weeds controlled

Apply to actively growing weeds.

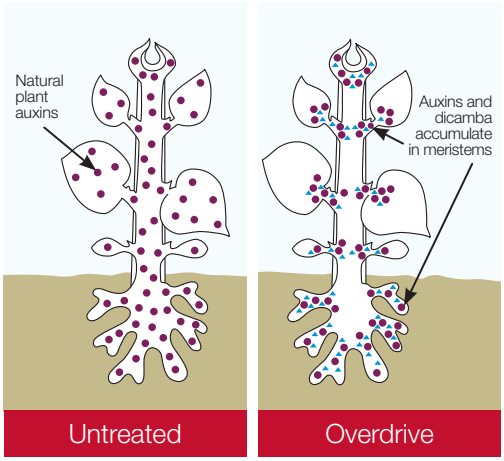
Annual broadleafs

Common ragweed, kochia[1], lady's thumb, lamb's quarters, redroot pigweed, tall waterhemp, velvetleaf, volunteer canola[2], wild buckwheat

Perennial/biennial broadleafs

Biennial wormwood, Canada thistle[3], dandelion[4], leafy spurge[4], perennial sow thistle[5], sweet clover[3], vetch[3]

Modes of action.



Source: BASF Canada

[1] Including Group 2- and Group 9-resistant biotypes.
[2] Apply at the cotyledon to 4-leaf stage.
[3] Top growth only.
[4] Top growth suppression only.
[5] Suppression only. Apply at the 2 to 10 leaf stage.

Environment, health and safety

General information

Combustibility:	Non-combustible
Regulation:	Not regulated by TDG or WHMIS
Toxicity:	Low (Signal Word: Caution)

Re-entry intervals

Non-agricultural: Once the spray residue has dried
Pasture and rangeland: 12 hours after application
Agricultural: 12 hours after application

User toxicology

Oral LD_{50}:	1,600 mg/kg
Dermal LC_{50}:	>5,000 mg/kg
Skin irritant:	Mildly irritating
Eye irritant:	Moderately irritating
Bioaccumulation:	No
Carcinogenic:	Non-carcinogenic
Mutagenic:	Non-mutagenic

Ecotoxicity

Birds:	Practically non-toxic (LD_{50} > 2,000 mg/kg)
Fish:	Practically non-toxic to slightly toxic (LC_{50} > 200 mg/L)
Aquatic insects:	Practically non-toxic to slightly toxic (LC_{50} > 1,000 mg/L)

Environmental fate

Volatility:	Moderate
Persistence:	Half-life in soil is 4 to 13 days
Erosion:	The potential for movement of dicamba on eroded soil is low.
Leaching:	Although risk is low because of its low active ingredient rate, Overdrive can leach in sandy soils or where the water table is shallow.
Buffer zones:	Leave an adequate buffer zone between spraying area and sensitive vegetation. Refer to label for information.
Grazing restrictions:	**Do not** permit lactating dairy animals to graze fields within 7 days after application. **Do not** harvest forage or cut hay within 30 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Handling precautions

Read Overdrive label before using.
Use goggles, gloves and coveralls when mixing.
Wash thoroughly after using. Launder clothes separately.

First aid

Eye contact:	Flush with water for 15 to 20 minutes
Skin contact:	Wash with soap and water
Inhalation:	Remove to fresh air
Ingestion:	Drink water, induce vomiting and seek immediate medical attention

Call 1-800-454-2673 for 24-hour assistance.

For more information

Visit **www.BetterVM.ca**.

Overdrive®
Herbicide

Your vegetation management solutions.

	Arsenal Powerline	Banvel VM	Detail	Overdrive
Broadleaf Weeds				
Absinthe		TGC		
Biennial wormwood				x
Black medic	x			
Bladder campion	x			
Bull thistle	x			
Burdock	x			
Canada thistle	x	x	x[1]	TGC
Canola, volunteer				x
Cinquefoil (rough)	x			
Cinquefoil (sulfur)	x			
Cleavers				
Clover	x			TGC
Common chickweed			x	
Common cocklebur			x	
Coomon groundsel			x	
Common mallow			x	
Common purslane			x	
Common ragweed	x	x		x
Common sunflower			x	
Cowcockle			x	
Curled dock		TGC		
Dandelion	x		x[1]	TGS
Diffuse knapweed		x		
Dog-strangling vine	x			
English daisy		x		
Field bindweed	x	x	x	
Fleabane	x		x	
Flixweed			x	
Giant Ragweed		x		
Goat's-beard	x	x		
Goldenrod	x	x		
Green smartweed				
Ground cherry		x		
Groundsel (common)	x			
Hemp-nettle	x			
Henbit			x	
Kochia	x[1]		x[1]	x[1]
Lady's-thumb		+ 2,4-D	x	x
Lamb's-quarters	x		x	x
Leafy spurge	x	TGC		TGS
Milkweed	x			
Morningglory			x	
Mouse-ear chickweed	x			
Mullein	x			
Mustard	x		x	
Nightshade			x	
Ox-eye daisy	x			
Pasture sage		x		
Pennsylvania smartweed			x	
Perennial sow thistle			TG	
Phragmites (non-aquatic areas)	x			
Pigweed	x		x	
Pineappleweed	x			
Plantain	x			
Poison ivy	x	+ 2,4-D		
Poverty weed		x		
Prickly lettuce			TG	
Prostrate knotweed			x	

	Arsenal Powerline	Banvel VM	Detail	Overdrive
Broadleaf Weeds				
Ragweed	x		x	
Reedgrass	x			
Russian thistle	x		x	
Scentless chamomile		TGC		
Sheep sorrel	x	x		
Shepherd's purse			x	
Sow-thistle (annual)	x		x	
Sow-thistle (Perennial)		x		
Sow-thistle (spiny)			x	
Stinkweed	x		x	
Tall waterhemp				
Tansy ragwort		x		
Tartary buckwheat				
Thyme-leafed spurge		x		
Toadflax	x			
Tufted vetch	x			
Vetch				TGC
Velvetleaf			x	x
Volunteer canola			x	
Wild buckwheat	x		x	x
Wild carrot	x	+ 2,4-D		
Wild grape	x			
Wild strawberry	x			
Grass & Sedge Species				
Bluegrass (annual)	x			
Bromegrass	x			
Canada bluegrass	x			
Fescue	x			
Foxtail	x			
Old witchgrass	x			
Quackgrass	x			
Yellow nutsedge	x			
Brush Species				
Alder		+ 2,4-D		
Balsam fir		+ 2,4-D		
Basswood		+ 2,4-D		
Birch		+ 2,4-D		
Black cottonwood		+ 2,4-D		
Bur oak		+ 2,4-D		
Cherry		+ 2,4-D		
Elm		+ 2,4-D		
Hickory		+ 2,4-D		
Maple	x	+ 2,4-D[1]		
Pine		+ 2,4-D		
Poplar	x	+ 2,4-D[1]		
Prickly rose		+ 2,4-D		
Raspberry	x			
Red oak		+ 2,4-D		
Spruce		+ 2,4-D		
Tamarack		+ 2,4-D		
Western snowberry		+ 2,4-D		
White ash		+ 2,4-D		
White cedar		+ 2,4-D		
Wild rose	x	+ 2,4-D		
Willow		+ 2,4-D		

For specific rates, timings and application details, refer to individual product labels for Arsenal Powerline, Banvel VM and Overdrive.

TG = Top growth only TGC = Top growth control TGS = Top growth suppression S = Suppression only [1]See product label for species controlled.

BASF Canada Inc.

For more information, visit **www.BetterVM.ca.**

Always read and follow label directions.

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