



2022

RANGE AND PASTURE

MANAGEMENT GUIDE



Effective. Reliable.
Sustainable
Pasture
Management
Solutions.



At Corteva Agriscience™, we know the long-term health and sustainability of your pastures is important.

When invasive weeds, brush and trees invade your pasture and rangeland, grass production suffers. You can make a positive change to the health and productivity of your pastures by implementing an integrated pasture management program through incorporating the use of our tailored range and pasture herbicide solutions.

Corteva Agriscience Range & Pasture Herbicides.
Effective. Reliable. Sustainable pasture management solutions.

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INTEGRATED PASTURE MANAGEMENT



A COMPLETE GRASS MANAGEMENT PLAN

An integrated pasture management plan to increase grass productivity employs techniques such as grazing rotations, herbicides, fertility analysis, mechanical brush management and regular pasture health assessments. To reduce weed, brush and tree encroachment over the long term, herbicide applications are often part of the plan.

Herbicides offer a long-term, proactive strategy with lasting results and are a highly effective alternative to short-term quick fixes such as mowing and cultivating. Before choosing a herbicide, consider the severity of your problem, the cost of lost production and the level of effort you're prepared to put into rejuvenation. But be aware that when grass production is declining, there is a high cost associated with doing nothing and ignoring the problem.

Each pasture has a life of its own. In some, weeds encroach from the perimeters while in others, weeds and brush consistently crowd out more and more grass. And in many, trees and woody species spread over larger and larger portions of land.

Breaking up permanent pasture is costly

With today's herbicide solutions available to control weeds, brush and trees while increasing grass productivity, breaking up permanent pasture should be considered only as a last resort. A mechanical approach is very costly, increases soil degradation and erosion, and in most cases will require re-seeding of grass. In the best case scenario, improved grass production is 24 to 36 months away, whereas a herbicide solution can give you results within the same season.

Using fire management for brush and tree control

Fire management is a natural and effective strategy for increasing pasture productivity; however, caution must be exercised to limit the risk of a fire that cannot be controlled and can become an unnecessary liability.

Making a change for the better

You can make a positive change to the health and productivity of your pastures by implementing an integrated pasture management program that will assist you in controlling the weeds, brush and trees that crowd valuable grass. With a little planning and forethought, you can increase your grass production, which leads to higher profits and a sustainable grazing resource for the future.

No doubt you have already observed different levels of grass production on your range and pasture land. Annual rainfall, soil quality, erosion, shade and the type of existing vegetation all work together to affect grass productivity. For example, certain areas of your land may consistently produce valuable grass while other areas have reduced productivity due to encroachment from weeds and brush. Start improving your grass stands by analyzing these factors:

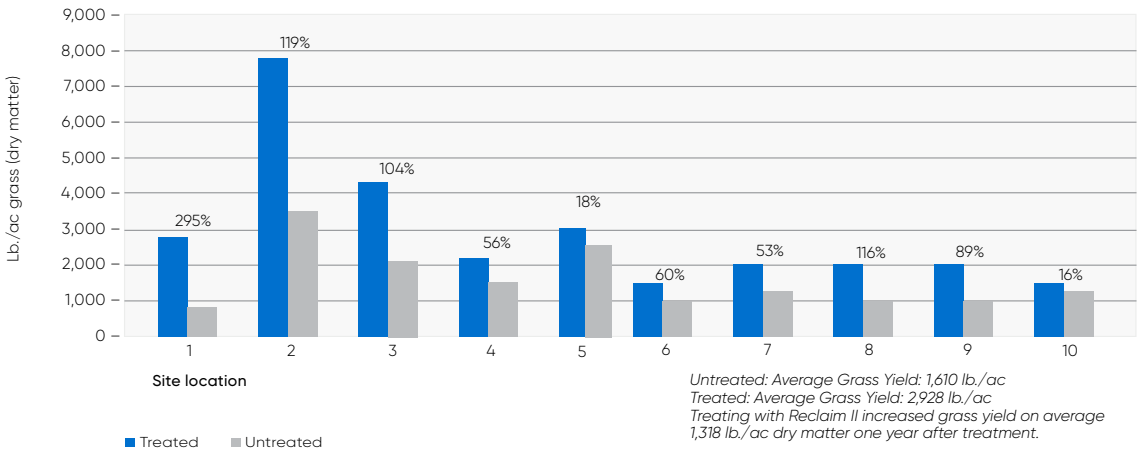
- Grazing management plan – Are you sticking to your rotational grazing plan? Do you limit the time livestock graze the stand?
- Grass stand fertilization – Have you soil tested in areas of poor grass production?
- Moisture management – Can you improve snow trapping techniques?
- Grass species – Is it time to introduce new species through replanting or overseeding?
- Weed and brush control – Are weeds and brush steadily encroaching on your pasture land? Are stocking rates declining?

Fewer weeds, more grass

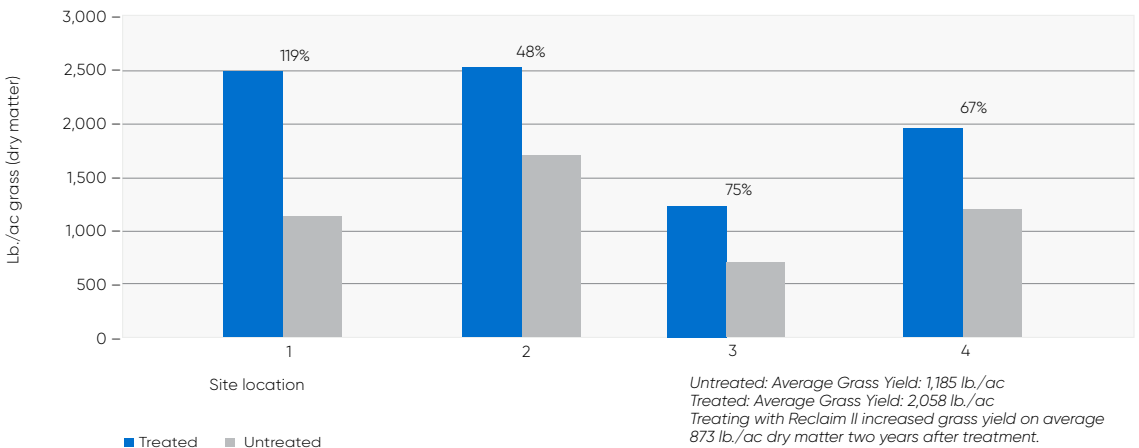
When weeds and brush start to take over pasture and rangeland, grass production suffers. However, when you take definite measures to control both weeds and brush, grass production increases not only the first year, but in subsequent years as well.

Research on 14 pasture and rangeland locations across the prairie provinces shows that in the first year Reclaim™ II herbicide was applied, grass production increased by an average of 101 percent or 1,318 lb./ac dry matter. The second year following treatment, the average increase was 77 percent or 873 lb./ac dry matter.

Increase in grass one year after treatment with Reclaim II



Increase in grass two years after treatment with Reclaim II



Source: 2008-2010 Corteva Agriscience field trials across Western Canada. Pasture conditions and grazing management influence grass response in different geographic areas.

IMPROVE PASTURE HEALTH AND PRODUCTIVITY WITH AN INTEGRATED PASTURE MANAGEMENT PLAN

Weeds, brush and trees are detrimental to a healthy and productive pasture. By being proactive, you can increase grass production on the same acres, improve the health of your herd and boost your profits while creating a sustainable grazing resource for the future. This starts with implementing an integrated pasture management plan that includes techniques such as grazing rotations, herbicide applications, fertility analysis, mechanical brush management and regular pasture health assessments.

A proactive strategy with lasting results

According to the Beef Cattle Research Council, bushes, forbs and shrubs provide habitat for wildlife and can make up over 20 per cent of livestock's diet on rangelands¹.

By using herbicides as part of an integrated pasture management, you can reduce undesirable or invasive weeds, brush and tree encroachment that can alter native ecosystems. This will also help you preserve native grass species and make an overall positive impact on the environment.

A guide to growing better grass

Growing more grass and managing it well is another way to maximize pasture productivity. With increased grass production, you can graze your cattle longer in the fall and turn them out earlier in the spring – subsequently reducing winter feed costs and contributing directly to your bottom line.

Additionally, you will be able to graze more cattle on the same number of acres and higher stocking density will increase competition for feed between cattle, so each animal will spend more time grazing and less time wandering. More grass also contributes to:

- Better herd condition
- Higher weaning weights
- Less time and fewer equipment costs associated with finding or producing feed
- Fewer weeds imported in bales of hay
- Improved ability of pastures to withstand drought
- Improved grass vigour

Effective and sustainable pasture management solutions

If you're looking to make a positive change to the health and productivity of your permanent grass pastures, Corteva Agriscience™ Range & Pasture products can help you effectively manage invasive weeds, brush and trees while providing an overall return on investment.

The Corteva Agriscience Range & Pasture product portfolio provides you with the most effective tools to improve the sustainability and long-term health of your pastures. Regular scouting is an important component of an integrated pasture management program. For weed monitoring to be effective, weed species must be properly identified.

- Restore™ II herbicide is an easy-to-use, broad spectrum product for the control of invasive broadleaf weeds such as scentless chamomile, tall buttercup and Canada thistle.
- Reclaim™ II herbicide delivers the most trusted extended control of broadleaf weeds and brush, such as silverberry (wolf-willow), Western snowberry (buckbrush) and wild rose.
- Grazon™ XC herbicide provides proven and effective extended control of a variety of broadleaf weeds and trees, such as aspen, birch and willow.

Corteva Agriscience Range & Pasture products are absorbed by leaves and roots, translocating throughout the plant, causing them to be controlled. This is especially important when looking to control biennial and perennial species. Plant growth will stop within 24 to 48 hours after treatment. Most susceptible weeds and shrubs will be controlled within four to eight weeks following application.

When compared with other methods of pasture rejuvenation, Restore II, Reclaim II and Grazon XC provide timely, increased grass production and extended weed, shrub and tree control.

By implementing an integrated pasture management plan through incorporating the use of our tailored Range & Pasture solutions, you will help your pasture reach its full grass production potential, improve your bottom line, enhance the health of your herd and create sustainable grazing resources for the future.

Improve pasture health and productivity

with an integrated pasture management plan.



Weeds, brush and trees are detrimental to healthy and productive pastures.

Proactively implementing an integrated pasture management plan helps:



Increase grass production on the same acres.



Improve the health of your herd.



Boost your profits.



Create a sustainable grazing resource.

Integrated pasture management includes:

Grazing rotations.

Herbicide applications.

Fertility analysis.

Mechanical brush management.

Regular pasture health assessments.

Integrating a pasture management program that includes herbicides will help you control the weeds, brush and trees that compete with valuable grass.



over
20%

of livestock's diet on rangelands is made up of bushes, forbs and shrubs.¹

Herbicides as part of an integrated pasture management plan help:



Reduce undesirable or invasive weeds, brush and tree encroachment.



Preserve native grass species.



Make a positive impact on the environment.

Leading herbicide solutions are proven to increase grass production.



Research on 14 pasture and rangeland locations across the prairie provinces shows:

101%

increase in grass production the 1st year Reclaim™ II herbicide was applied or 1,318 lb./ac dry matter.

77%

increase the 2nd year following treatment or 873 lb./ac dry matter.

More grass equals increased grazing efficiencies.

Stocking rate on an 80 acre pasture using Animal Days per Acre (ADA)²:



UNTREATED:

80 acres

X

14 ADA

= 1,120

Animal Days³

TREATED:

80 acres

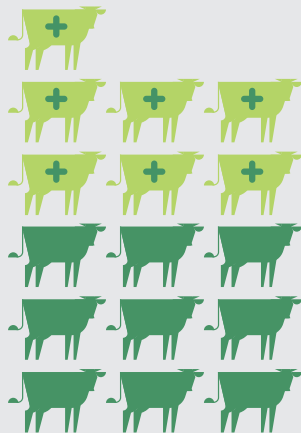
X

25 ADA

= 2,000

Animal Days

If the goal is to graze for 120 days, the stocking rate is:



UNTREATED:

1,120 Animal Days

÷

120 days of grazing

= 9.3 Cows

can be grazed on 80 acres for 120 days.

TREATED:

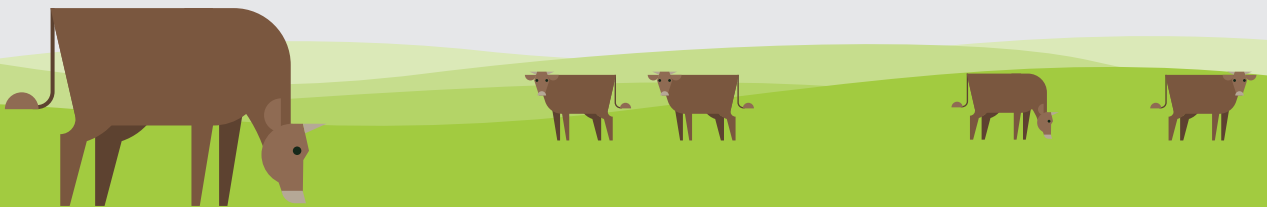
2,000 Animal Days

÷

120 days of grazing

= 16.6 Cows

can be grazed on 80 acres for 120 days.



Increased grass production boosts your bottom line.

Graze your cattle longer in the fall.
Turn them out earlier in the spring.
→ Reduce winter feed costs.

Graze more cattle on same number of acres.
→ Higher stocking density increases competition for feed.
→ Animals spend more time grazing and less time wandering.

More grass contributes to:



Better herd condition.

Higher weaning weights.

Less time and fewer equipment costs while finding or producing feed.

Fewer weeds imported in bales of hay.

Improved grass vigour.

Improved ability of pastures to withstand drought.

Effective. Reliable. Sustainable Pasture Management Solutions.

Make a positive change to the health and productivity of your permanent grass pastures by making Corteva Agriscience™ Range & Pasture herbicides part of your integrated pasture management plan.

Grazon™ XC
HERBICIDE

Reclaim™ II
HERBICIDE

Restore™ II
HERBICIDE

Learn more about our solutions at RangeandPasture.Corteva.ca

¹ Beef Cattle Research Council <http://www.beefresearch.ca/research-topic.cfm/weed-and-brush-control-in-pastures-15>

² Animal Days per Acre (ADA) is the amount of grass one animal consumes in one day.

³ Animal Days is the area needed to feed one animal for one day.

AGRONOMY



BROADLEAF WEEDS, SHRUBS AND TREES	RESTORE™ II HERBICIDE	RECLAIM™ II HERBICIDE	GRAZON™ XC HERBICIDE	TORDON™ 22K HERBICIDE
ABSINTH WORMWOOD		X		
ANNUAL SOW THISTLE	X	X		
ANNUAL SUNFLOWER		X		
ASPEN			X	
BABY'S BREATH		X		
BALL MUSTARD		X		
BALSAM POPLAR			Suppressed	
BIENNIAL WORMWOOD	Season-long	X		
BIRCH			X	
BITTER SNEEZEWEED	X			
BLACK HENBANE		X		
BLUEBUR	X	X		
BLUE LETTUCE	Season-long			
BROWN KNAPWEED		X		
BULL THISTLE	X			
BURDOCK	X	X	X	
CANADA FLEABANE	X	X	X	
CANADA GOLDENROD	X	X	X	
CANADA THISTLE	X	X	X	X
CHICKWEED	X	X		
COCKLEBUR	X	X		
COMMON BROOMWEED	X			
COMMON GROUNDSEL	X	X		

BROADLEAF WEEDS, SHRUBS AND TREES	RESTORE™ II HERBICIDE	RECLAIM™ II HERBICIDE	GRAZON™ XC HERBICIDE	TORDON™ 22K HERBICIDE
COMMON PLANTAIN	X		X	
COMMON PURSLANE	X			
COMMON RAGWEED	X	X	X	
COMMON TANSY	Suppressed	X		
COMMON YARROW	Suppressed		X	
CORN SPURRY		X		
COW COCKLE		X		
CUDWEED	X	X		
CURLY DOCK	<4 Leaf	X	X	
DAISY FLEABANE	X			
DANDELION	Season-long	X	X	
DIFFUSE KNAPWEED	Suppressed	ΔΔ		X
DOG MUSTARD	X	X		
FALSE FLAX	X			
FIELD BINDWEED	Season-long	Top growth only		X
FIELD PEPPER-GRASS		X		
FIELD SCABIOUS		X		
FIREWEED		X		
FLIXWEED	X	X		
FULLER'S TEASEL	X			
GOAT'S BEARD	X	X		
GREEN SMARTWEED		X		
GUMWEED	Season-long	X		
HAIRY BUTTERCUP	X			

QUICK REFERENCE GUIDE

For control of weeds, shrubs and trees

BROADLEAF WEEDS, SHRUBS AND TREES	RESTORE™ II HERBICIDE	RECLAIM™ II HERBICIDE	GRAZON™ XC HERBICIDE	TORDON™ 22K HERBICIDE
HAIRY FLEABANE	X			
HAIRY GALINSOGA		X		
HAWKWEED	X	X		
HEAL-ALL	X			
HEDGE BINDWEED	Season-long	X		
HEMP-NETTLE		X		
HOARY ALYSSUM		X		
HOARY CRESS	Season-long	X		
HORSENETTLE	X	X		
JAPANESE KNOTWEED		X		
KNOTWEED	<4 Leaf			
LADY'S-THUMB		X		
LAMB'S-QUARTERS	X	X		
LEAFY SPURGE	Season-long		*	X
MOUSE-EARED CHICKWEED	Season-long			
MUSK OR NODDING THISTLE	X	X		
MUSTARDS (EXCEPT DOG & TANSY)	X			
NARROW-LEAVED HAWK'S-BEARD	X	X		
OAK-LEAVED GOOSEFOOT	X	X		
ORANGE HAWKWEED		ΔΔΔ		
OX-EYE DAISY	X	X		
PASTURE SAGE (FRINGED SAGE)		X		X
PEPPERGRASS	X			

BROADLEAF WEEDS, SHRUBS AND TREES	RESTORE™ II HERBICIDE	RECLAIM™ II HERBICIDE	GRAZON™ XC HERBICIDE	TORDON™ 22K HERBICIDE
PERENNIAL PEPPERWEED		X		
PERENNIAL SOW THISTLE	X	X		X
PINEAPPLEWEED	X			
PLANTAIN		X		
PLUMELESS THISTLE	X	X		
POVERTY WEED				X
PRAIRIE SAGE		X		
PRAIRIE WILD ROSE		X	X	
PRICKLY LETTUCE	X	X	X	
PROSTRATE PIGWEED	X	X		
PURPLE LOOSESTRIFE		X		
PUSSYTOES		X		
RED CLOVER			X	
REDROOT PIGWEED	X	X		
RUSSIAN KNAPWEED	Suppressed	X		X
RUSSIAN PIGWEED	X			
RUSSIAN THISTLE	X	X		
SCENTLESS CHAMOMILE	X	X		X
SHEEP SORREL	X			
SHEPHERD'S PURSE	X	X		
SHRUBBY CINQUEFOIL		X		
SILVERBERRY (WOLF WILLOW)		X		

BROADLEAF WEEDS, SHRUBS AND TREES	RESTORE™ II HERBICIDE	RECLAIM™ II HERBICIDE	GRAZON™ XC HERBICIDE	TORDON™ 22K HERBICIDE
SMARTWEED (PENNSYLVANIA & GREEN)	x			
SPOTTED KNAPWEED	x	x		x
STINGING NETTLE	x			
STINKWEED	x	x		
STORK'S-BILL		x		
SWEET CLOVER	x	x	x	
TALL BUTTERCUP	x	x		
TALL IRONWEED	x			
TANSY RAGWORT	x			
TARTARY BUCKWHEAT	Season-long	x		
TROPICAL SODA APPLE	x			
TROPIC CROTON	x			
TUMBLEWEED		x		
VELVETLEAF	x			
VETCH		x	x	
VOLUNTEER ALFALFA		x		
VOLUNTEER CANOLA	x	x		
WESTERN RAGWEED	x	x		
WESTERN SNOWBERRY (BUCKBRUSH)		x	Suppressed	
WILD BUCKWHEAT		x		
WILD CARAWAY		x		

BROADLEAF WEEDS, SHRUBS AND TREES	RESTORE™ II HERBICIDE	RECLAIM™ II HERBICIDE	GRAZON™ XC HERBICIDE	TORDON™ 22K HERBICIDE
WILD CARROT		x	x	
WILD MUSTARD		x		
WILD PARSNIP		x		
WILD RADISH	x	x		
WILD STRAWBERRY		x		
WILD SUNFLOWER	x			
WILLOW			x	
YELLOW HAWKWEED		ΔΔΔ		
YELLOW ROCKET	< 4 Leaf			
YELLOW STARThistle	x	x		
YELLOW TOADFLAX			*	x

These tables are meant as a guide. Always read and follow label directions.





ΔΔ Apply when plants are actively growing with the optimum time of application occurring from rosette to the bolting stages of development or in the fall

ΔΔΔ Apply to plants in the bolting stage of development





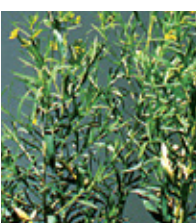
* For control of leafy spurge and toadflax under less than optimum growing conditions, use a recommended surfactant such as Gateway™ adjuvant at the rate of 0.25 percent by volume (250 mL per 100 L of water)

Identification of weeds, shrubs and trees






At first glance a pasture may look green and healthy, but upon closer inspection, you may find weeds that are robbing valuable forage from your pastures and profitable weight gain from your cattle. Left untreated, weeds can rob a pasture of up to 63 percent of forage yield, while invasive weeds can rapidly take over a pasture – both significant reasons to know what is going on in your pastures and how to identify unwanted species. Invasive plants are those that can thrive and spread aggressively, to the extent that they are believed to cause damage to the environment. They have the ability to reduce the quality and quantity of forage available by making them less accessible or attractive to grazing animals and by competing with desirable plants.

NAME	IMAGE	HERBICIDE	APPLICATION
<p>ABSINTH WORMWOOD</p> <p><i>Weed, invasive</i></p>		<p>Reclaim™ II herbicide (20 ac/case)</p> <p>Restore™ II herbicide (1 L/ac)</p> <p>Grazon™ XC herbicide – Control has been observed when applied at 1.9 L/ac for a wide variety of susceptible species.</p>	<p>Treat in the juvenile stage, when actively growing. Best timing: early to mid-June.</p> <p>Add a non-ionic surfactant such as Gateway™ adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p>ASPEN, WHITE POPLAR</p> <p><i>Tree</i></p>		<p>Grazon XC herbicide (2.5 L/ac)</p>	<p>Ensure active growth with no insect or disease pressures. Apply at full leaf until August on trees up to 12' in height.</p> <p>Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Grazon XC for ground application and 1% v/v for aerial application.</p>
<p>BIRCH</p> <p><i>Tree</i></p>		<p>Grazon XC herbicide (2.5 L/ac)</p>	<p>Ensure active growth with no insect or disease pressures. Apply at full leaf until August.</p> <p>Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Grazon XC for ground application and 1% v/v for aerial application.</p>
<p>CANADA THISTLE</p> <p><i>Weed, invasive</i></p>		<p>Reclaim II herbicide (20 ac/case)</p> <p>Grazon XC herbicide (1.9 L/ac)</p> <p>Restore II herbicide (1 L/ac)</p>	<p>Spray once all thistles have emerged, prior to flowering – typically in mid-June to late July. For infestations that have been established for over two years, either broadcast or spot applications may be required in subsequent years to manage the problem and to remove heavy infestations. Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>







NAME	IMAGE	HERBICIDE	APPLICATION
<p>COMMON TANSY</p> <p><i>Weed, invasive</i></p>		<p>Reclaim™ II herbicide (20 ac/case) Grazon™ XC herbicide – Control has been observed when applied at 1.9 L/ac for a wide variety of susceptible species.</p>	<p>Apply from rosette to bolt, prior to flowering. Add a non-ionic surfactant such as Gateway™ adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p>DANDELION</p> <p><i>Weed</i></p>		<p>Reclaim II herbicide (20 ac/case) Grazon XC herbicide (1.9 L/ac)</p>	<p>Apply anytime from early spring when rosettes are first emerging up to the end of flowering – typically late May to mid-July. Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p>HOUND'S TONGUE</p> <p><i>Weed, invasive</i></p>		<p>Reclaim II herbicide (20 ac/case) Restore™ II herbicide (1 L/ac)</p>	<p>Apply when actively growing, prior to flowering. Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p>HAWKWEED SPECIES</p> <p><i>Weed, invasive</i></p>		<p>Reclaim II herbicide – Control has been observed when applied at 20 ac/case for a wide variety of susceptible species. Restore II herbicide – Control has been observed when applied at 1 L/ac for a wide variety of susceptible species.</p>	<p>Apply when actively growing, prior to flowering. Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p>LEAFY SPURGE</p> <p><i>Deep-rooted perennial, invasive</i></p>		<p>Tordon™ 22K: Broadcast – 1.8 L/acre; Spot spray – 3.6 L/ac where no more than 50% of an acre is treated. Grazon XC: 1.9 L/ac</p>	<p>Apply when actively growing when in full true flower, prior to seed set. Grazon XC provides seasonal control of leafy spurge. Subsequent treatments may be required. Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Grazon XC for ground application and 1% v/v for aerial application.</p>





QUICK REFERENCE GUIDE
Identification of weeds, shrubs and trees

NAME	IMAGE	HERBICIDE	APPLICATION
<p style="text-align: center;">LOW EVERLASTING SAGE (PUSSY-TOES)</p> <p><i>Weed, invasive</i></p>		<p>Grazon XC herbicide – Control has been observed when applied at 1.9 L/ac for a wide variety of susceptible species.</p> <p>Reclaim II herbicide– Control has been observed when applied at 20 ac/case for a wide variety of susceptible species.</p>	<p>Apply when actively growing, prior to flowering.</p> <p>Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p style="text-align: center;">OX-EYE DAISY</p> <p><i>Weed, invasive</i></p>		<p>Reclaim II herbicide (20 ac/case)</p> <p>Restore II herbicide (1 L/ac)</p> <p>Grazon XC herbicide – Control has been observed when applied at 1.9 L/ac for a wide variety of susceptible species.</p>	<p>Apply when actively growing, prior to flowering.</p> <p>Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p style="text-align: center;">PASTURE SAGE (FRINGED)</p> <p><i>Weed</i></p>		<p>Reclaim II herbicide (20 ac/case)</p> <p>Grazon XC herbicide – Control has been observed when applied at 1.9 L/ac for a wide variety of susceptible species.</p>	<p>Apply when actively growing, prior to flowering.</p> <p>Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p style="text-align: center;">PRAIRIE SAGE</p> <p><i>Weed</i></p>		<p>Reclaim II herbicide (20 ac/case)</p> <p>Grazon XC herbicide – Control has been observed when applied at 1.9 L/ac for a wide variety of susceptible species.</p>	<p>Apply when actively growing. Early to mid-June is ideal.</p> <p>Add a non-ionic surfactant such as Gateway™ adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p style="text-align: center;">SCENTLESS CHAMOMILE</p> <p><i>Weed, invasive</i></p>		<p>Reclaim II herbicide (20 ac/case)</p> <p>Restore II herbicide (1 L/ac)</p> <p>Grazon XC – Control has been observed when applied at 1.9 L/ac for a wide variety of susceptible species.</p>	<p>Apply when actively growing, prior to flowering.</p> <p>Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>






NAME	IMAGE	HERBICIDE	APPLICATION
<p>SHRUBBY CINQUEFOIL</p> <p><i>Shrub</i></p>		<p>Reclaim™ II herbicide (20 ac/case)</p>	<p>Apply to actively growing plants, after full leaf expansion. The best timing is early/mid-June to early July.</p> <p>Add a non-ionic surfactant such as Gateway™ adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p>SILVERBERRY (WOLF WILLOW)</p> <p><i>Shrub</i></p>		<p>Reclaim II herbicide (20 ac/case)</p>	<p>Apply to actively growing plants after full leaf expansion, but prior to the development of a waxy cuticle on the leaf of the shrub – typically early June to mid-July.</p> <p>Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p>SPOTTED KNAPWEED</p> <p><i>Weed</i></p>		<p>Reclaim II herbicide (20 ac/case) Restore™ II herbicide (1 L/ac) Grazon™ XC herbicide – Control has been observed when applied at 1.9 L/ac for a wide variety of susceptible species.</p>	<p>Apply prior to flowering in the spring – typically late May to June. Application during the summer will provide control; however, either broadcast or spot applications may be required in subsequent years to manage the problem and to remove heavy infestations.</p> <p>Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p>TALL BUTTERCUP</p> <p><i>Weed, invasive</i></p>		<p>Reclaim II herbicide (20 ac/case) Restore II herbicide (1 L/ac) Grazon XC herbicide – Control has been observed when applied at 1.9 L/ac for a wide variety of susceptible species.</p>	<p>Apply anytime from early spring when rosettes are first emerging up to the later stages of flowering – typically late May to mid-July.</p> <p>Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>

QUICK REFERENCE GUIDE
Identification of weeds, shrubs and trees

NAME	IMAGE	HERBICIDE	APPLICATION
<p>WESTERN SNOWBERRY (BUCKBRUSH)</p> <p><i>Shrub</i></p>		<p>Reclaim II herbicide (20 ac/case)</p>	<p>Apply to actively growing plants after full leaf expansion, but prior to the development of a waxy cuticle on the leaf of the shrub – typically June to early July. Late springs will delay full leaf out and applications should be delayed. Control will be reduced if applied later in the season, past mid-July, once plants have hardened off. Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p>WHITE COCKLE</p> <p><i>Weed, invasive</i></p>		<p>Reclaim II herbicide – Control has been observed when applied at 20 ac/case for a wide variety of susceptible species.</p>	<p>Apply when actively growing, prior to flowering. Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p>WILD CARAWAY</p> <p><i>Weed, invasive</i></p>		<p>Reclaim II herbicide (20 ac/case) Restore II herbicide – Control has been observed when applied at 1 L/ac for a wide variety of susceptible species.</p>	<p>Apply when actively growing, prior to flowering. Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p>WILD ROSE</p> <p><i>Shrub</i></p>		<p>Reclaim II herbicide (20 ac/case)</p>	<p>Apply to actively growing plants, after full leaf expansion – typically June to mid-July. Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>

QUICK REFERENCE GUIDE
Identification of weeds, shrubs and trees

NAME	IMAGE	HERBICIDE	APPLICATION
<p>WILD STRAWBERRY</p> <p><i>Weed</i></p>		<p>Reclaim™ II herbicide (20 ac/case)</p>	<p>Apply when actively growing, prior to flowering. Add a non-ionic surfactant such as Gateway™ adjuvant at 0.25% v/v to Reclaim II for ground application and 1% v/v for aerial application.</p>
<p>WILLOW</p> <p><i>Tree</i></p>		<p>Grazon™ XC herbicide (2.5 L/ac)</p>	<p>Ensure active growth with no insect or disease pressures. Apply at full leaf until August, before trees are 12' tall. Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Grazon XC for ground application and 1% for aerial application.</p>
<p>YELLOW TOADFLAX</p> <p><i>Deep-rooted perennial, invasive</i></p>		<p>Tordon™ 22K herbicide (broadcast – 1.8 L/ac; spot spray – 3.6 L/ac where no more than 50% of an acre is treated) Grazon XC herbicide (1.9 L/ac)</p>	<p>Apply when actively growing, when the majority of the population is flowering, prior to seed set. Grazon XC will provide seasonal control of yellow toadflax. Subsequent treatments may be required. Add a non-ionic surfactant such as Gateway adjuvant at 0.25% v/v to Grazon XC for ground application and 1% v/v for aerial application.</p>

RANGE & PASTURE PRODUCTS



Reclaim™ II

HERBICIDE

Reclaim™ II herbicide delivers the most trusted extended control of broadleaf weeds and brush.

Product description

Reclaim II is a selective broadleaf weed and shrub control herbicide for use in rangeland and permanent pasture. It provides extended control of shrubs and broadleaf weed species.

Guidelines for use

One case of Reclaim II treats 20 acres. For best results, apply Reclaim II in a minimum of 20 gal/ac (80 L/ac) of water by ground and 5 gal/ac (20 L/ac) of water by air. Reclaim II requires the addition of a non-ionic surfactant such as Gateway™ adjuvant at 0.25% v/v (2.5 L per 1000 L of spray solution) for ground application or 1% v/v for aerial application.

For backpack applications to small areas, mix 2.3 g of Reclaim II A with 17 mL of Reclaim II B and 20 mL of surfactant in 10 L of water. Thoroughly and uniformly wet the foliage of all target plants but not to the point of runoff.

Do not spray if injury to existing forage legumes cannot be tolerated. Do not apply Reclaim II within the dripline of desirable trees and take appropriate measures to prevent application or drift onto plants and trees that are not intended for control.

Timing

Reclaim II should be applied after the target weed and shrub species have emerged and prior to plant growth ceasing and leaves hardening off. Shrub species will develop a waxy cuticle on the leaf surface resulting in reduced uptake and control later in the season.

Environmental stresses such as severe drought or extended periods of heat may decrease efficacy.

Results

Reclaim II is absorbed by the leaves and roots, translocating throughout the plant, causing the plant to be controlled. Most susceptible weeds and shrubs will be controlled within four to eight weeks following an application. When compared with other methods of pasture rejuvenation, Reclaim II provides timely, increased grass production and extended weed and shrub control.

Tank mixes

For control of low growing brush such as western snowberry and wild rose, as well as tree species such as willow and poplar growing in the same area, Reclaim II can be tank mixed with Grazon™ XC herbicide. Please contact your Corteva Agriscience™ Range & Pasture Regional Account Manager for rate recommendations and timing.

Refer to the product label for complete use instructions.

Weeds and shrubs controlled

- Absinth wormwood
- Annual sunflower
- Baby's breath
- Ball mustard
- Biennial wormwood
- Black henbane
- Bluebur
- Brown knapweed
- Burdock
- Canada fleabane
- Canada goldenrod
- Canada thistle
- Chickweed
- Clover
- Cocklebur
- Common groundsel
- Common tansy
- Corn spurry
- Cow cockle
- Cudweed
- Curly dock
- Dandelion
- Dog mustard
- Field bindweed*
- Field peppergrass
- Field scabious
- Fireweed
- Flixweed
- Goat's-beard
- Green smartweed
- Gumweed
- Hairy galinsoga
- Hawkweed
- Hedge bindweed
- Hemp-nettle
- Hoary alyssum
- Hoary cress
- Horse nettle
- Lady's-thumb
- Lamb's-quarters
- Musk thistle
- Narrow-leaved hawk's-beard
- Oak-leaved goosefoot
- Orange hawkweed
- Ox-eye daisy
- Pasture sage (*fringed sage*)
- Perennial pepperweed
- Plantain
- Plumeless thistle
- Prairie sage
- Prickly lettuce
- Prostrate pigweed
- Purple loosestrife
- Pussytoes
- Ragweed (*common, western*)
- Redroot pigweed
- Russian knapweed
- Russian thistle
- Scentless chamomile
- Shepherd's purse
- Shrubby cinquefoil
- Silverberry (*wolf willow*)
- Sow thistle (*annual, perennial*)
- Spotted knapweed
- Stinkweed
- Stork's-bill
- Sweet clover
- Tall buttercup
- Tartary buckwheat
- Tumbleweed
- Vetch
- Volunteer alfalfa
- Volunteer canola
- Western snowberry (*buckbrush*)
- Wild buckwheat
- Wild mustard
- Wild radish
- Wild rose
- Wild strawberry
- Yellow starthistle

* *Suppression*

"We do a lot of rotational grazing on Black Bear Provincial Grazing Reserve's 17,000 acres. The big problem in northern Alberta is that trees are constantly growing in open pastures, so we use a mix of Grazon™ XC and Reclaim™ II herbicides to control the poplars and willows along our fence lines.

We also spray Reclaim™ II by itself to control tansy, tall buttercups, Canada thistle and fireweed, which has significantly improved the health of our grass and animals. We usually run about 1,350 cow calf pairs and between 500-600 yearlings, and when we have better grass, we get better gains on our animals.

Having used Corteva Agriscience™ Range & Pasture products for about 15 years, I can testify that your reps really know their stuff and have been a great source of knowledge to tap into."

Russell Spearin

President, Black Bear Provincial Grazing Reserve
Westlock, AB

Restore™ II

HERBICIDE

Restore™ II herbicide is an easy-to-use, broad spectrum product for the control of invasive broadleaf weeds.

Product description

Restore II is a systemic, post-emergence broadleaf herbicide designed for the management of a broad spectrum of broadleaf weeds and invasive species in rangeland and permanent grass pastures. It contains a Group 4 active ingredient that works like a natural growth-regulating hormone found only in plants. Mammals do not metabolize Restore II.

Guidelines for use

One case of Restore II treats 20 acres. Apply in a minimum of 20 gal/ac total spray solution for ground applications and 5 gal/ac solution for aerial applications. For backpack applications to small areas, create a 0.24 percent solution with 10 L of water. Thoroughly and uniformly wet the foliage of all target plants but not to the point of runoff.

Do not spray if injury to existing forage legumes cannot be tolerated. Do not apply Restore II within the dripline of desirable trees and take appropriate measures to prevent application or drift onto plants and trees that are not intended for control.

Timing

Restore II should be applied to actively growing weeds, after emergence, prior to flowering. Application timing to provide control of all species of weeds must occur when all target species have emerged. Plants that have not emerged at the time of application will not be effectively controlled (especially perennial weeds).

Environmental stresses such as severe drought or extended periods of heat may decrease efficacy.

Results

Restore II herbicide is absorbed by leaves and roots, translocating throughout the plant, causing the plants to be controlled. Depending on the weed species, you can expect to see results within hours or days. Plant growth will stop within 24 to 48 hours after treatment. Most annual, susceptible weeds will be controlled within four to eight weeks following application. A successful application of Restore II will provide a notable improvement in grass production.

"We started our pasture management program with Corteva Agriscience™ about six years ago when we had noxious weeds taking over our native and tame grass pastureland. Since that time, we are seeing an increase of stocking rate up to 30 per cent on our treated pastures and added an extra month to the grazing season.

After getting the sulphur cinquefoil and knapweed under control with Gazon™ XC herbicide, we're now using Reclaim™ II herbicide to take care of the scotch thistle, hoary alyssum and buckbrush. By keeping our pastures healthy, we're basically converting grass into beef and seeing a big return on investment."

Nick Bapty

*Cow Boss, Coldstream Ranch
Coldstream, BC*

Weeds controlled

- Absinth wormwood
- Biennial wormwood
- Bindweed
(field, hedge)
- Bitter sneezeweed
- Bluebur
- Blue lettuce
- Bull thistle
- Burdock
- Buttercup
(hairy, tall)
- Canada fleabane
- Canada goldenrod
- Canada thistle
- Cocklebur
- Common broomweed
- Common chickweed
- Common plantain
- Common purslane
- Cudweed
- Curly dock
- Dandelion
- False flax
- Fleabane
(daisy, hairy)
- Flixweed
- Fuller's teasel
- Goat's-beard
- Green smartweed
- Groundsel
- Gumweed
- Hawkweed
- Heal-all
- Hoary cress
- Horsenettle
- Knotweed
- Lamb's-quarters
- Mouse-eared chickweed
- Musk or nodding thistle
- Mustards
- Narrow-leaved hawk's-beard
- Oak-leaved goosefoot
- Ox-eye daisy
- Pennsylvania ragweed
- Peppergrass
- Pineappleweed
- Plumeless thistle
- Prickly lettuce
- Prostrate pigweed
- Ragweed
(common, western)
- Redroot pigweed
- Russian pigweed
- Russian thistle
- Scentless chamomile
- Sheep sorrel
- Shepherd's purse
- Sow thistle
(annual, perennial)
- Spotted knapweed
- Stinging nettle
- Stinkweed
- Sulphur cinquefoil
- Sweet clover
- Tall ironweed
- Tansy ragwort
- Tartary buckwheat
- Tropical soda apple
- Tropic croton
- Velvetleaf
- Volunteer canola
- Wild radish
- Wild sunflower
- Yellow rocket
- Yellow starthistle

Grazon™ XC

HERBICIDE

Grazon™ XC herbicide provides proven and effective extended control of a variety of broadleaf weeds and trees.

Product description

Grazon XC is effective against a broad spectrum of undesirable trees and weeds in permanent pastures. It provides long-lasting control and is most effective on foliage of actively growing plants. The unique chemistry moves through the plant to control even the roots. This is especially important when looking to control biennial and perennial species.

Guidelines for use

Grazon XC is labeled for use at 1.9 L/ac for weed control and up to 2.5 L/ac for tree control. A non-ionic surfactant such as Gateway™ adjuvant at 0.25% v/v for ground application and 1% v/v for aerial application should be added to achieve optimal control of tree species. Apply in a minimum of 20 gal/ac (80 L/ac) of water by ground or 5 gal/ac (20 L/ac) of water by air. Use coarse sprays to minimize drift.

For backpack applications to small areas, create a 0.67 percent solution of Grazon XC in water (67 mL of Grazon XC per 10 L of water) for weed and shrub control, or a 2 percent solution of Grazon XC in water for tree control. For all applications, coverage of the targeted foliage is very important.

Do not spray if injury to existing forage legumes cannot be tolerated. Do not apply Grazon XC within 1.5 times the height of desirable trees, and take appropriate measures to prevent application or drift onto plants and trees that are not intended for control.

Weeds and trees controlled

- Aspen
- Balsam poplar*
- Birch
- Burdock
- Canada thistle
- Common ragweed
- Common yarrow
- Dandelion
- Dock
- Fleabane
- Goldenrod
- Leafy spurge
- Plantain
- Prickly lettuce
- Sweet clover
- Toadflax
- Vetch
- Wild carrot
- Wild prairie rose
- Wild rose
- Willow

*Suppression

Timing

Grazon XC should be applied when the primary target weed is most actively growing, prior to flowering. Grazon XC can only control weeds and root systems that get treated; if some weeds have not emerged at the time of application, these weeds will not have the same level of control as weeds that were fully emerged.

For control of leafy spurge and yellow toadflax under less than optimum growing conditions, use a recommended surfactant such as Gateway at 0.25 percent v/v (250 mL per 100 L water). Subsequent treatments may be required to achieve complete control. Environmental stresses such as severe drought or extended periods of heat may decrease efficacy.

Tank mixes

For control of low growing brush such as western snowberry and wild rose, as well as tree species such as willow and poplar growing in the same area, Grazon XC can be tank mixed with Reclaim™ II herbicide. Please contact your Corteva Agriscience™ Range & Pasture Regional Account Manager for rate recommendations and timing.

Refer to the product label for complete use directions.

Tordon™ 22K

HERBICIDE

Tordon™ 22K herbicide provides the longest lasting control of deep-rooted perennial weeds such as leafy spurge and toadflax.

Product description

Tordon 22K is effective against deep-rooted, perennial broadleaf weeds due to its systemic activity. It translocates throughout the weed's roots, providing control.

Guidelines for use

Tordon 22K can be used as a broadcast spray at a rate of 1.8 L/ac in 20 gal/ac spray solution. Tordon 22K can ONLY be applied by ground application equipment. For backpack applications to small areas create a 0.5 percent solution of Tordon 22K in water (50 mL of Tordon 22K per 10 L of water). Apply the mixture to achieve total coverage of target plants. Apply the solution to the weeds and an area around the infestation to avoid "donuting" (runners sending up shoots outside the treated area). Use coarse sprays to minimize drift. For all applications, coverage of the weed foliage is very important.

Most warm and cool season rangeland and pasture grasses are tolerant to Tordon 22K; however, grass vigour may be reduced for a period of up to two years while the active ingredient is metabolized by the grass.

Tordon 22K is persistent in the soil. Very permeable (over 40 percent sand) soils should not be treated if shallow (less than 6 feet) underlying aquifers are present. Observe precautions described on the product label to minimize spray drift during application.

Do not spray on areas where damage to legumes cannot be tolerated. Do not apply Tordon 22K within 1.5 times the height of desirable trees, and take appropriate measures to prevent application or drift onto plants and trees that are not intended for control.

Weeds controlled

- Canada thistle
- Diffuse knapweed
- Field bindweed
- Leafy spurge
- Pasture sage
- Perennial sow thistle
- Poverty weed
- Russian knapweed
- Scentless chamomile
- Spotted knapweed
- Toadflax

*For spot treatment where less than 50 percent of the hectare is treated, a rate of 3.6 L/ac may be used.
To control infestations, plan for a sequential treatment in one or two years following initial application.*

Timing

Tordon 22K may be applied on rangeland and pasture to control weeds when fully developed green leaves are present and the weeds are actively growing. For control of leafy spurge, application should be timed when the plants are in true flower stage, which occurs when the green flowers are present inside of the yellow bracts. Application in late summer or in periods of dry weather when plants are not actively growing may result in unsatisfactory control.

Results

Initially, target plants will show limited visual activity following an application of Tordon 22K. Effects including twisting of stems and cupping of leaves can be observed between 45 to 60 days following an application.

Refer to the product label for complete use directions.

Gateway™

ADJUVANT

Gateway™ adjuvant is an innovative non-ionic, paraffinic oil blend surfactant developed for use with the Range & Pasture portfolio of products from Corteva Agriscience.

Product description

Gateway Adjuvant is designed for use with Grazon™ XC and Reclaim™ II herbicides.

Why use Gateway Adjuvant?

- Industry leading technology. An innovative adjuvant formulation unique to Corteva Agriscience and non-ionic surfactants.
- Performance. Gateway improves plant uptake in challenging environmental conditions.
- Tank mixability. Labeled for use with the Range & Pasture portfolio of products from Corteva Agriscience requiring surfactants.

Not all surfactants are created equal

It is well established that many herbicides require the addition of a surfactant to improve efficacy.

How do surfactants improve herbicide efficacy?

Increased efficacy comes from improved spray retention on the target weed, greater droplet spreading across the leaf surface and improved herbicide uptake into the target species.

Target grass and broadleaf weed species differ in leaf structure, size and growth habit. Their leaf surfaces can vary widely from hairy (black henbane), to smooth and waxy (leafy spurge). Surfactants help reduce the impact of these physical barriers to herbicide entry into the plant.

If a surfactant is not used with certain herbicides then the water in the spray solution, which has a high surface tension, forms discrete droplets on the leaf surface causing uneven herbicide coverage.

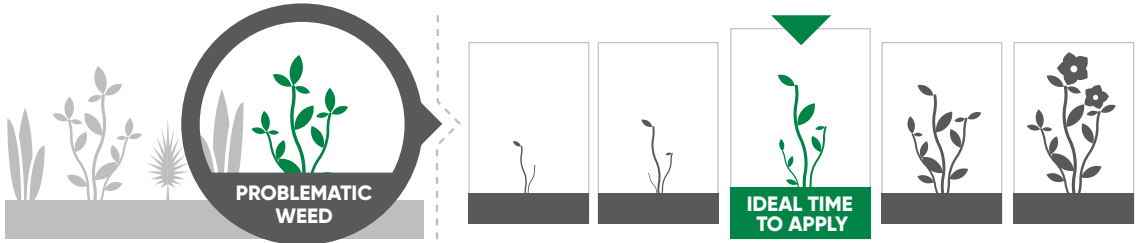
For best herbicide performance, a spray droplet must wet foliage, spread out and cover the leaf. Surfactants reduce surface tension of the spray droplet and the interfacial tension between that droplet and the leaf, improving herbicide uptake and translocation for better weed control.



STEWARDSHIP & BEST PRACTICES



Corteva Agriscience™ Range & Pasture products are effective tools in managing weeds, brush and trees in permanent pasture and grazed rangeland. Understanding precautions, restrictions and how to steward range and pasture products properly is important to ensure satisfactory results and to protect desirable species and the environment.



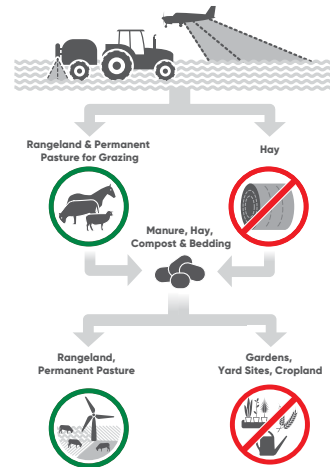
Application timing

Herbicide application should be made after the majority of the target weed populations have emerged and are actively growing.

- The ideal timing for application will generally be in June through mid-July with the exception of Canada thistle which enters its ideal timing in mid- to late July when the majority of plants have emerged.
- Timing varies from season to season due to environmental conditions that influence growth and plant staging.
- When targeting shrubs such as buckbrush or wolf willow, they must be fully leafed out prior to an application.

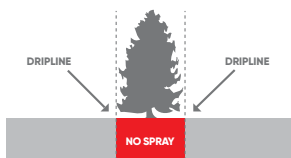
Hay, soil and manure management

- Soil from treated areas should never be moved to areas where sensitive plants may be planted within five years.
- Manure from livestock consuming treated grass should never be used for compost or around susceptible plants.
- Clippings from grass that have been treated with Corteva Agriscience Range & Pasture herbicides should never be used for composting nor mulching.

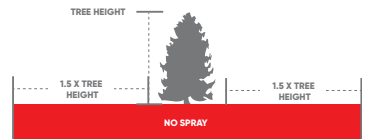


Buffers

- Reclaim™ II herbicide and Restore™ II herbicide should NOT be used over the top of desirable trees. They should only be used up to the dripline (outermost edge of the tree canopy) of desirable trees. Use additional caution around lateral root systems, shallow rooting species and those that propagate vegetatively through layering.
- Grazon™ XC herbicide and Tordon™ 22K herbicide should NOT be used over the top of desirable trees.



Applications should remain a distance of 1.5 times the height of desirable trees at all times.




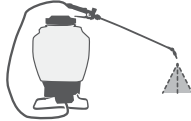
- Do not apply Grazon XC or Tordon 22K to coarse texture soils (>40 percent sand) with a high water table (within 1.8 metres or 6 feet of the soil surface).
- Do not apply Grazon XC or Tordon 22K within 30 metres (approximately 100 feet) of an open water body (does not include dugouts) or as per provincial regulations.

Grazing and Cutting Restrictions

- No grazing restrictions for livestock. Seven-day grazing restriction for lactating dairy animals for Restore™ II herbicide, Reclaim™ II herbicide, Grazon™ XC herbicide and Tordon™ 22K herbicide.
- Withdraw all animals three days prior to slaughter.
- If forage must be removed from an area treated with Restore II, Reclaim II, Grazon XC or Tordon 22K, do not cut the forage within 30 days of application.
- If livestock is being moved from a pasture treated with Corteva Agriscience™ Range & Pasture herbicides to a legume-based pasture, it is recommended that animals be grazed on an untreated, non legume-based pasture for three days when treating with Restore II or Reclaim II and seven days when treating with Grazon XC or Tordon 22K.

Range and pasture products are designed for permanent grass pasture and rangeland where grazing is the method of harvest. The manure or compost from an animal fed treated forage should only be used on appropriate use sites where the loss of broadleaf plants, including legumes, can be tolerated.

Broadcast and spot spraying

	Broadcast Application <i>20 gal/ac water volume</i>	Spot Application <i>Mixing in 10 L water</i>
		
RESTORE™ II ▲	20 ac/case	24 mL (i.e. 0.24% solution)
RECLAIM™ II ▲	20 ac/case PLUS 0.25% v/v non-ionic surfactant	2.3 g Reclaim II A 17 mL Reclaim II B 20 mL surfactant
GRAZON™ XC ■	1.9 L/ac for weed control Tree rates: contact Corteva Agriscience	67 mL (i.e. 0.67% solution)
TORDON™ 22K ■	1.84 L/ac	50 mL (i.e. 0.5% solution)
For Backpack/Spot Application: ▲ Thoroughly and uniformly wet the foliage, but not to the point of runoff. ■ Apply to foliage until wet, up to the point of runoff. Maximum one application per year for all treatments.		

Re-Seeding and Grass Tolerance



- Newly seeded grass should not be sprayed until secondary root development and a minimum of four leaf surfaces have established – well past the seedling stage.



- Safe to established grasses.
- Grasses may be seeded 10 months following an application.
- Legume re-establishment may be affected for up to five years.
- Soil organic matter, rainfall and temperature all affect the rate of degradation.



- Avoid applications under stress conditions when grass is not actively growing (hot or cold weather, excessive moisture or drought) as grass injury, including leaf discoloration and stunting of growth, in the season of application may result.

Water volumes

Ground:
Minimum 20 gal/ac
Aerial:
Minimum 5 gal/ac

Rainfast



OPTIMIZE THE APPLICATION TIMING OF YOUR PASTURE HERBICIDES

Corteva Agriscience™ Range & Pasture herbicides are effective tools in managing weeds, brush and trees in permanent grass pastures. Understanding how to optimize their application timing is important to ensure satisfactory results and to protect desirable species and the environment.

Identification of weeds, brush and trees

At first glance a pasture may look green and healthy, but upon closer inspection, you may find weeds that are robbing valuable forage from your pastures and profitable weight gain from your cattle. Left untreated, weeds can rob a pasture of up to 63 percent of forage yield, while invasive weeds can rapidly take over a pasture. Invasive plants are those that thrive and spread aggressively, to the extent that they are believed to cause damage to the environment. They have the ability to reduce the quality and quantity of forage by making it less accessible and/or attractive to grazing animals and by competing with desirable plants. Those are significant reasons to identify unwanted species and control them, ultimately protecting the long-term health and sustainability of your pastures.

Application timing of unwanted species

Herbicide applications should be done after the majority of the target weed populations have emerged and are actively growing, prior to flowering. The ideal timing for most weeds will generally be early June through mid-July with the exception of Canada thistle which enters its ideal timing in mid to late July when the majority of plants have emerged. When targeting shrubs such as buckbrush or wolf willow, ensure they are at full leaf expansion and have not developed a waxy cuticle on the leaf – ideal timing is typically June to early July. When targeting less than 12' in height trees such as aspen and willow, ensure they are actively growing with no insect nor disease pressure and are at full leaf expansion – ideal timing is before August. Timing may vary from season to season due to environmental conditions that influence growth and plant staging.

Ideal application timing of Range & Pasture herbicides

Restore™ II herbicide is an easy-to-use, broad spectrum product for the control of invasive broadleaf weeds such as scentless chamomile, tall buttercup and Canada thistle. Reclaim™ II herbicide delivers the most trusted extended control of broadleaf weeds and brush, such as silverberry (wolf-willow), Western snowberry (buckbrush) and wild rose. Grazon™ XC herbicide provides proven and effective extended control of a variety of broadleaf weeds and trees, such as aspen, birch and willow.

Proper application timing to a broad range of weeds may be challenging since emergence and growth stages may occur at different times throughout the season. Target your herbicide application when your most problematic weed is actively growing. For example, if your primary weed is absinth wormwood, Restore II application timing will likely be May 15 to June 15. If your main target is buckbrush, Reclaim II application timing will likely be June 1 to July 15. Shrub species will develop a waxy cuticle on the leaf surface resulting in reduced uptake and control later in the season. Finally, if you are looking to control Canada thistle, you need to wait long enough for the majority of the thistles to emerge before applying Grazon XC, likely July 1 to July 30. If environmental stresses such as severe drought or extended periods of heat are inhibiting growth, this may decrease product efficacy.

Corteva Agriscience Range & Pasture herbicides control weeds and root systems that are treated; if some weeds have not emerged at the time of application, these weeds will not have the same level of control as weeds that were fully emerged. Water volume is also an important component to ensure proper coverage of the target plant. Use a minimum of 20 gallons of water per acre for ground applications and 5 gallons of water per acre for aerial applications. Maximum one application per year for all treatments, refer to the product label for complete use directions.



WHAT ARE MY OPTIONS TO TAKE BACK CONTROL OF MY PASTURE?

Certainly burning, mowing and re-seeding are all options; however, when deciding what method is right for your operation, it's important to consider cost, convenience, effectiveness and physical disruption on your pasture's grass stand and to your cattle operation. There are pros and cons to each:

- Controlled burning is not always "controlled" and poses a risk to environmental and personal safety – an increased risk of wildfire and hazardous health conditions.
- Brush suckers and invasive weeds move back in almost immediately after removal.
- Mowing makes the pasture look better temporarily, but often makes the problem worse by encouraging undesirable root systems to spread and shoot up new growth.
- Ripping up and re-seeding is expensive, hard on equipment and sometimes unsuccessful, taking valuable pasture out of production.

Herbicides designed to improve grass production in rangeland and permanent pastures can be a highly effective and convenient alternative – one definitely worth looking into for your grazing management plan.

Choose your method of application

As you build your grass management plan, there are a variety of application methods to choose from based on the species you want to control and the density of infestation.

Ground broadcast

Ground application is an excellent way to control weed infestations and shorter brush infestations on even terrain.

- Keep the boom high enough to clear foliage and provide suitable coverage, but low enough to minimize the chance of drift.
- Carefully calibrate your equipment to ensure precise application and economical use of your herbicide investment.
- GPS guidance and foam markers can help you avoid skips or excessive overlaps.
- Coverage is critical to this method's effectiveness – using a minimum water volume of 20 gallons per acre will ensure best coverage.
- For optimum results, wait for the full population to emerge with leaves fully expanded and when plants are actively growing, prior to flowering.

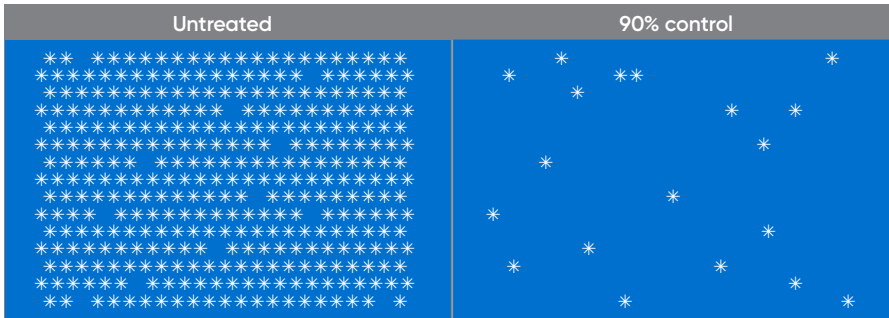
Aerial broadcast

Aerial application is the most feasible and cost-effective way to treat large areas when dense brush growth and rough pasture terrain limit your ability to reach target species with ground application equipment. Plant height can also prohibit access, even with moderate brush infestations.

With fixed-wing and rotary aircraft, apply Reclaim™ II, Restore™ II and Grazon™ XC herbicides in 5 gallons of total spray volume per acre for best coverage and results.

Ninety percent control

Even with the outstanding control of undesirable vegetation that range and pasture products provide, there may be some weeds and shrubs present following an application. What does 90 percent control look like?



Treating dense infestations and large areas

If your target vegetation includes hard-to-control perennial weeds, shrubs and trees, make sure to keep water volumes up to maximize coverage of weeds.

Timing

Timing an application can be a challenge, and it is important that you time the application based on weed growth and staging. Because range and pasture herbicides are growth inhibitors, target weeds must be actively growing at the time of application for effective control. Only weeds and shrubs that have emerged at the time of application will be controlled. Application to weeds and shrubs under conditions of extreme moisture stress will reduce the long-term level of control.



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