

North Dakota Noxious and Troublesome Weeds

www.ag.ndsu.nodak.edu/invasiveweeds/

Photographs and descriptions of weeds (except quackgrass) in this section can be found in NDSU Extension publication W-1411.

By North Dakota Law, all land owners must control noxious weeds on their property.

Refer to the following Extension Circulars for additional information:

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* Weed is a North Dakota State Noxious Weed.	
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BINDWEED, FIELD

Extension Bulletin W-802, "Identification and Control of Field Bindweed" provides additional information.

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs																									
Roundup / generic glyphosate + Banvel / generic dicamba	Up to 1.5 lb ae + 1 pt (1.5 lb + 0.5 lb ae) See Remarks.	Preplant, fallow, post-harvest, and CRP.	Actively growing. Vines: At least 12 inches long. Apply at beyond full bloom.	<table border="0"> <tr> <td>lb ae/gal</td> <td>lb ai/gal</td> <td>1.5 ae</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>4</td> <td>= 64 fl oz</td> <td></td> <td></td> </tr> <tr> <td>4/4.17</td> <td>5.4/5.1</td> <td>= 48 fl oz</td> <td></td> <td></td> </tr> <tr> <td>4.5</td> <td>5.5</td> <td>= 44 oz</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>6.1</td> <td>= 40 fl oz</td> <td></td> <td></td> </tr> </table> <p>Less potential for soil residual than with higher rates of dicamba applied alone. Add AMS at 4 to 8 lb/100 gal, or more for hard water. A4-7 Z1. Pages: 102-103, 104-105, 108-110.</p>	lb ae/gal	lb ai/gal	1.5 ae			3	4	= 64 fl oz			4/4.17	5.4/5.1	= 48 fl oz			4.5	5.5	= 44 oz			5	6.1	= 40 fl oz		
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Roundup / generic glyphosate + 2,4-D	<0.376 lb ae + 1.5 pt 4EC/SL (0.38 + 0.75 lb ae)	Preplant, fallow, post-harvest.	Vines: 6 to 18 inches long.	Suppression in patches or individual plants. Allow at least 7 days between application and tillage. Control is reduced under dry conditions. Add AMS at 4 lb/100 gal, or more for hard water to improve weed control. A4-7 Z1. Pages: 102-103, 104-105.																									
2,4-D amine or ester	1.5 to 2 pt 4SL (0.75 to 1.0 lb ae) 1.33 to 2 pt 4EC (0.66 to 1.0 lb)	Spring wheat and barley.	Crop: Tiller stage.	The high rate may injure crop but is beneficial in small areas to control bindweed. Does not provide long term control. T6 Z1. Pages: 102-103, 104-105.																									
Express / generic tribenuron + 2,4-D + Banvel / generic dicamba	0.17 to 0.3 oz DF 0.25 to 0.5 oz SG + 0.5 pt 4EC/SL + 2 to 3 fl oz (0.125 to 0.25 oz + 0.25 lb ae + 1 to 1.44 oz ae)	Spring wheat including durum.	Crop: Tillering and before crop exceeds the 5-leaf stage.	Provides season-long control. 2,4-D enhances weed control and crop safety. Add NIS at 0.125% v/v.																									
Escort / generic metsulfuron + 2,4-D + Banvel / generic dicamba	0.05 to 0.1 oz XP + 0.5 pt 4EC/SL + 2 to 3 fl oz (0.0375 to 0.075 oz + 0.25 lb ae + 1 to 1.44 oz ae)			Do not apply metsulfuron within 22 months from last metsulfuron treatment or on soils above a pH of 7.9. Refer to metsulfuron label for additional restrictions. C14 C18 T6 Y3. Pages: 102-103, 104-105, 108-110.																									
2,4-D	1 pt 4EC/SL (0.5 lb ae)	Corn.	Corn: 3 to 8 inches tall.	Use drop nozzles after corn is more than 8 inches tall. Provides field bindweed suppression only. C23 T2 Z1																									
Banvel / generic dicamba	0.5 to 1 pt (0.25 lb ae)		Corn: See remarks.	Apply 0.5 to 1 pt/A up to 8 inches tall. Apply 0.5 pt/A post-direct from 8 inches to 36 inches tall or 15 days prior to tassel. B5 C8 D8 T6 Z1. Pages: 102-103, 104-105, 108-110.																									
Roundup / generic glyphosate	1 to 1.5% solution or <3 lb ae (3 lb ae) See Remarks.	Patches in wheat, barley, oat, corn, soybean or trees.	Crop: Prior to heading or flowering. Bindweed: Bud to flowering stage.	<table border="0"> <tr> <td>lb ae/gal</td> <td>lb ai/gal</td> <td>1.5 ae</td> <td>2.25 ae</td> <td>3 ae</td> </tr> <tr> <td>3</td> <td>4</td> <td>= 64 fl oz</td> <td>96 fl oz</td> <td>128 fl oz</td> </tr> <tr> <td>4/4.17</td> <td>5.4/5.1</td> <td>= 48 fl oz</td> <td>72 fl oz</td> <td>96 fl oz</td> </tr> <tr> <td>4.5</td> <td>5.5</td> <td>= 44 oz</td> <td>66 fl oz</td> <td>88 fl oz</td> </tr> <tr> <td>5</td> <td>6.1</td> <td>= 40 fl oz</td> <td>60 fl oz</td> <td>80 fl oz</td> </tr> </table> <p>Crop will be killed in treated area. Avoid drift or spraying tree foliage. Repeat applications are required for complete control. Apply to actively growing bindweed. Add AMS fertilizer at 4 lb/100 gal, or more for hard water. Refer to label for adjuvant use. A4-7 B2 T4-6 X1. Pages: 102-103, 104-105.</p>	lb ae/gal	lb ai/gal	1.5 ae	2.25 ae	3 ae	3	4	= 64 fl oz	96 fl oz	128 fl oz	4/4.17	5.4/5.1	= 48 fl oz	72 fl oz	96 fl oz	4.5	5.5	= 44 oz	66 fl oz	88 fl oz	5	6.1	= 40 fl oz	60 fl oz	80 fl oz
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Pages 102-103 = Herbicides resistance, Pages 104-105 = Generic and commercial names, Pages 108-110 = Crop rotation restrictions.

BINDWEED, FIELD cont.

Herbicide	Product/A (ai/A)	Weed Location	When to Apply	Remarks and Paragraphs
Paramount (quinclorac)  Ransom and Richland counties	0.33 lb DF (0.25 lb)	Fallow, post-harvest or preplant in spring prior to seeding wheat including durum. May control foxtails, vol. flax, barnyardgrass.	See "Weed Location" and Remarks and Paragraphs" sections.	Apply with MSO adjuvant at 2 pt/A. AMS at 2.5 lb/A or UAN at 1 gal/A will improve control but do not substitute for MSO. Apply after harvest but prior to frost. Suggested to use a 3-year program with 0.33 lb DF/A the first year and 0.17 to 0.33 lb DF/A in following years. B7 T1 Y15. Pages: 108-110
	0.5 lb DF (0.375 lb)	CRP, pasture, rangeland.	Fall: Prior to frost. Bindweed: At least 4 inches long and actively growing.	Allow 7 days before haying. Add MSO-type adjuvant at 2 pt/A. T1.
2,4-D ester	2 to 4 pt 4EC (1 to 2 lb ae)	Fallow or post-harvest, and CRP.	Bindweed: Actively growing and regrowth 12 inches long to bud.	Apply only registered brands of 2,4-D in CRP. Cultivate fallow land until early July to achieve optimum growth at time of application. Spray in late August or September. Respray in following crop. Does not provide long term control. T4-6 T8. Pages: 102-103, 104-105.
Banvel / generic dicamba	2 to 4 pt (1 to 2 lb ae)			Mid to late fall treatments more effective than summer treatments. Rotate to wheat, corn, soybean or sorghum only. Crop injury may occur if the interval between application and planting is less than 45 days per pt/A dicamba used, excluding days when ground is frozen. Add NIS at 0.25% v/v to improve control. T4-6 T10. Pages: 102-103, 104-105, 108-110.
Banvel / generic dicamba	4 to 16 pt (2 to 8 lb ae)	Patches or individual plants in CRP, pastures, fallow, and noncropland.		Apply to foliage and/or soil. Consult label for grazing restrictions. Use low rate only in fall and high rates in dense or old stands. Addition of NIS improves consistency of control. T4-5 T10. Pages: 102-103, 104-105, 108-110.
Tordon 22K (picloram) + 2,4-D RUP	2 to 4 pt + 1 to 2 pt 4EC/SL (0.5 to 1 + 0.5 to 1 lb ae)	Pasture, rangeland, CRP, and noncropland.		Picloram + 2,4-D is more cost-effective than picloram alone at higher rates. Consult reference for grazing restrictions. T4-5 T15 Y16. Pages: 102-103, 104-105, 108-110.
Paramount + Overdrive (quinclorac) (dicamba & diflufenzopyr)	8 oz DF + 6 oz WDG (6 oz + 3 oz ae & 1.2 oz)		Fall: Bindweed: Prior to a killing frost. At least 4 inches of stem.	Allow 7 days before haying. Add MSO-type adjuvant at 2 pt/A. B7 T1 T10.

Pages 102-103 = Herbicides resistance, Pages 104-105 = Generic and commercial names, Pages 108-110 = Crop rotation restrictions.

KNAPWEED, DIFFUSE AND SPOTTED AND STARTHISTLE, YELLOW

Extension Bulletin W-1146, "Know Your Knapweed" provides photos and additional information.

Extension Bulletin W-1222, "Yellow Starthistle Identification and Control" provides photos and information.

Herbicide	Product/A (ai/A)	Weed Location	When to Apply	Remarks and Paragraphs
2,4-D amine or ester	2 to 4 pt 4EC/SL (1 to 2 lb ae)	Fallow, post-harvest, CRP, pasture, and rangeland.	Rosette stage is preferred.	Several years of annual treatment are necessary. Use only registered 2,4-D brands for CRP. T4-6 T8
Banvel / generic dicamba	2 to 4 pt (1 to 2 lb ae)		Bud to bloom is second best.	Plants are controlled slowly. Adding NIS improves consistency of control. T10. Pages: 102-103, 104-105, 108-110.
Tordon 22K (picloram) RUP	1 to 2 pt (0.25 to 0.5 lb ae)	CRP, pasture, rangeland, and noncropland.	Rosette stage preferred.	Consult label for grazing restriction. Apply up to 2 pt/A broadcast and 4 pt/A for spot treatment. T8 T15 Y16
Tordon 22K + RUP 2,4-D amine / ester	1 to 2 pt + 1 qt 4EC/SL (0.25 to 0.5 + 1 lb ae)		Bud to bloom is second best.	
Plateau (imazapic)	6 fl oz (1.5 oz ae)		Rosette stage in the fall.	<u>For yellow starthistle only.</u> Do not apply more than 4 oz/A in CRP. Add MSO adjuvant at 1 qt/A + 28% UAN at 1 qt/A. Refer to label for restrictions. T13 T17
Milestone (aminopyralid)	3 to 7 oz (0.75 to 1.75 oz ae)		Spring: Rosette to bolting. Fall: Rosettes.	Apply up to 14 oz/A for spot treatment. Use lower rates for yellow starthistle. Refer to label for grazing restrictions. T12 Z1
Transline (clopyralid)	2/3 to 1 pt (4 to 6 oz ae)	Noncropland and right-of-way.	Rosette to bud stage.	Add NIS at 0.25% v/v. Stinger is labeled for CRP.
Roundup / generic glyphosate	1.5 to 2.25 lb ae See Remarks.	Fallow and noncropland.	Bud to bloom stage - late summer to early fall.	Other vegetation will also be killed. Retreat the following spring with 2,4-D at 2 to 4 pt/A to control seedlings and escapes. Refer to label for adjuvant use. Add AMS at 4 lb/100 gal, or more for hard water. A4-7 B2 T4-8 X1. Pages: 102-103, 104-105.

Pages 102-103 = Herbicides resistance, Pages 104-105 = Generic and commercial names, Pages 108-110 = Crop rotation restrictions.

KNAPWEED, RUSSIAN

Extension Bulletin W-1146, "Know Your Knapweed" provides photos and additional information.

Herbicide	Product/A (ai/A)	Weed Location	When to Apply	Remarks and Paragraphs
Milestone (aminopyralid)	5 to 7 oz (1.25 to 1.75 oz ae)	CRP, pasture, rangeland, and noncropland.	Spring: Bud to flowering stage. Fall: Dormant plants.	Apply up to 14 oz/A for spot treatment. Refer to label for grazing restrictions. T12
Plateau (imazapic)	12 fl oz (3 oz ae)		Apply following several hard frosts (mid-October). Plants may be dormant with grey stems and no leaves.	Add MSO adjuvant at 1 qt/A + 28% UAN at 1 qt/A. Rates above 8 fl oz/A can reduce grass production. T12 T17
Tordon 22K (picloram) RUP	3 to 4 pt (0.75 to 1 lb ae)		Application in mid-September or during flowering in mid-summer provides shorter-term control than late applications.	Consult label for grazing restriction. Apply up to 2 pt/A broadcast and 4 pt/A for spot treatment. T8 T15

LYTHRUM OR PURPLE LOOSESTRIFE

Extension Circular W-1132, "Identification and Control of Purple Loosestrife" provides additional information.

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
Rodeo / generic 4 lb ae/gal glyphosate approved for aquatic use	1 to 1.5 gal/100 gal 1.3 to 1.9 fl oz/gal water of a 4 lb/gal conc. (1 to 1.5% conc.)	Drainage and aquatic sites.	July to early September.	Use only registered 4 lb ae/gal glyphosate formulations. Add an NIS approved for use in aquatic sites at 0.75% v/v. Control seedlings using a 2,4-D formulation labeled for use near water. Biological control agents have been introduced for control. A4-7 B2 T19 X1
Garlon 3A (triclopyr)	1 to 3 gal/100 gal water (3 to 9 lb ae)			Minimize overspray to open water especially application along shore of flowing water. Does not affect cattail or desirable grass species. T19
Habitat (imazapyr)	1 pt (0.25 lb ae)			Plants actively growing.
Milestone (aminopyralid)	1 pt/100 gal (0.125% conc.)	Non-irrigation ditch banks, wildlife or natural areas, seasonally dry wetlands, including riparian areas.	July to early September.	Do not apply directly to water. Safe under or near many tree species. T12.
Milestone VM Plus (triclopyr & aminopyralid)	1 gal/100 gal (1% conc.)			
Biological Control	Insects			Two leaf feeding beetles (<i>Galerucella</i> spp.) have been successful in the state. Contact your local weed control officer or state APHIS officer in Bismarck. T19.

QUACKGRASS

Herbicide	Product/A (ai/A)	Weed Location	When to Apply	Remarks and Paragraphs
Roundup / generic glyphosate	0.75 lb ae	See label.	See label. Generally 6 to 12 inches tall	See label for registered uses, rates for different formulations, and application information. A3-7 B2 X1
Maverick Olympus	2/3 oz DF 0.6 to 0.9 oz WDG	- HRS wheat - Winter wheat		See label for registered uses, rates for different formulations, and application information.
SU herbicides Accent/nicosulfuron Resolve/rimsulfuron Option/foramsulfuron	See label.	Registered crops.		See label for application information, adjuvants, and use information. MSO adjuvants give greater control than other adjuvant types. A5-7 D3 Y3. Pages: 102-103, 104-105, 108-110.
POST grass herbicides	See page 26.	Labeled broadleaf crops.		Add oil adjuvant at 1% v/v but not less than 1.25 pt/A. Oil adjuvant more than 1 qt/A is not needed. E3

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SALT CEDAR

Extension Bulletin W-1222, "Saltcedar Identification and Control" provides additional information.

Herbicide	Product/A (ai/A)	Weed Location	When to Apply	Remarks and Paragraphs
Arsenal / generic imazapyr	1% solution to foliage or 2 qt/A aerial applied to foliage or 12 oz/gal as a cut stump treatment immediately after cutting.	Wildlife openings and wildlands.	August or September is best but can be applied anytime saltcedar is found. Plants should have green leaves (foliar application).	Thoroughly wet foliage. Do not cut down and remove for at least three years following foliar treatment or regrowth will occur. Add MSO-type adjuvant at 1 qt/A for foliar application or 0.5 to 1% for backpack sprayer or NIS at 0.25% v/v. Avoid drift and contact with desirable plants. Do not contaminate surface water.
Garlon 4 (triclopyr)	25% v/v + oil adjuvant (1 qt + 2 qt) (1 lb ae)	Non-cropland as basal bark or cut stump.	Treatment in late fall or early spring are most successful; otherwise any time when the bark is not frozen.	Do not spray over open water or irrigation ditches. Complete coverage around the stem or over the cut stump is required for good control. Do not allow spray runoff to puddle.

SPURGE, LEAFY

Extension Bulletins W-765, "Leafy Spurge Identification and Control", W-866, "Integrated Management of Leafy Spurge", and W-1088, "Leafy Spurge - Biology, Ecology and Management" provide additional information.

Herbicide	Product/A (ai/A)	Weed Location	When to Apply	Remarks and Paragraphs																														
2,4-D amine or ester	2 to 4 pt 4EC/SL (1 to 2 lb ae)	Fallow.	Leafy spurge: Actively growing.	Cultivate or respray whenever regrowth is 4 to 6 inches tall. Retreat in next years crop. T4-5 T8. Pages: 102-103, 104-105.																														
Banvel / generic dicamba	2 to 4 pt (1 to 2 lb ae)	Fallow or post-harvest.	Leafy spurge: Spring: True flower stage. Fall: 4 to 12 inch regrowth.	Crop injury may occur when the interval between application and planting is less than 45 days per pt/A dicamba used excluding days when ground is frozen. Surfactant improves consistency of control. T4 T10 Y10. Pages: 102-103, 104-105, 108-110.																														
Paramount (quinclorac)  Ransom and Richland counties	0.33 lb DF (0.25 lb)	Fallow, post-harvest or preplant in spring prior to seeding wheat.	See "Weed Location" and Remarks and Paragraphs" sections.	Apply with MSO adjuvant at 2 pt/A. AMS at 2.5 lb/A or UAN at 1 gal/A will improve control but do not substitute for MSO. Apply after harvest but prior to frost. B7 T1 Y15. Pages: 108-110																														
	0.5 lb DF (0.375 lb)	Pasture and rangeland.	Fall: Prior to frost Leafy spurge: Actively growing.	Allow 7 days before haying. Use an MSO-type adjuvant at 2 pt/A. Provides only suppression of leafy spurge. T4-5 B7																														
2,4-D amine or ester	2 to 4 pt 4EC/SL (1 to 2 lb ae)	CRP, pasture and rangeland.	Leafy spurge: Early bud stage and fall.	Apply both spring and fall for satisfactory control. Do not graze dairy cows for 7 days or beef cows for 3 days after treatment. Apply only registered 2,4-D brands in CRP. T4-5 T8 T16																														
Tordon 22K (picloram) + 2,4-D ester or amine RUP	1 to 2 pt + 2 pt 4EC/SL (0.25 to 0.5 + 1 lb ae)	CRP, pasture, rangeland and roadsides.	Leafy spurge: Spring: True flower stage. Fall: 4 to 12 inch regrowth.	Tordon + 2,4-D at 1 pt/A + 2 pt/A is the most cost-effective treatment in NDSU data. Retreatment at the same rate will be necessary for several years regardless of herbicide or rate. Annual control was greater and years of retreatment needed were less with the 2 pt/A Tordon rate. Fall treatments should use 2 pt/A and apply for 3 to 5 years consecutively . T4 T15-16																														
Tordon 22K + Plateau + 2,4-D + MSO adjuvant (picloram + imazapic) RUP	1 pt + 4 fl oz + 1 qt 4EC/SL + 1 qt (4 oz ae + 1 oz ae + 1 lb ae)		Leafy spurge: True flower growth in spring.	Do not apply in fall. Addition of Plateau improves long-term leafy spurge control. 2,4-D is not required but does increase spectrum of weeds controlled. Follow labels of all herbicides used. Apply only in spring when plants are in true flower. Some grasses may show temporary stunting. T5 T13 T15-16																														
Tordon 22K + Overdrive (picloram + dicamba & diflufenzopyr) RUP	1 to 2 pt + 4 to 6 oz WDG (4 to 8 oz ae+ 2 to 3 oz ae & 0.8 to 1.2 oz)		Leafy spurge: Spring: True flower stage.	NIS at 0.25% v/v improves weed control. Overdrive improves long-term leafy surge control with spring but not fall application timing. T4 T15-16																														
Banvel / generic dicamba	4 pt (2 lb ae)			Add NIS at 0.25% v/v to improve control. T10																														
	4 to 16 pt (2 to 8 lb ae)	Patches or individual plants in CRP, pasture or noncropland.	Leafy spurge: Spring: True flower stage. Fall: 4 to 12 inch regrowth.	Consult label for grazing restrictions. NIS improves consistency of control. Re-treatment necessary.																														
Tordon 22K (picloram) RUP	4 pt (1 lb ae)			Consult narrative for grazing restrictions. T15																														
Roundup / generic glyphosate	0.75 to 1.5 lb ae See Remarks.	CRP and trees.	Leafy spurge: After July 1 to actively growing plants.	<table border="0"> <tr> <td><u>lb ae/gal</u></td> <td><u>lb ai/gal</u></td> <td><u>0.38 ae</u></td> <td><u>0.75 ae</u></td> <td><u>1.125 ae</u></td> <td><u>1.5ae</u></td> </tr> <tr> <td>3</td> <td>4</td> <td>= 16 fl oz</td> <td>32 fl oz</td> <td>48 fl oz</td> <td>64 fl oz</td> </tr> <tr> <td>4/4.17</td> <td>5.4/5.1</td> <td>= 12 fl oz</td> <td>24 fl oz</td> <td>36 fl oz</td> <td>48 fl oz</td> </tr> <tr> <td>4.5</td> <td>5.5</td> <td>= 11 fl oz</td> <td>22 fl oz</td> <td>32 fl oz</td> <td>44 fl oz</td> </tr> <tr> <td>5</td> <td>6.1</td> <td>= 10 fl oz</td> <td>20 fl oz</td> <td>30 fl oz</td> <td>40 fl oz</td> </tr> </table> Non-selective. Avoid spraying tree foliage. Retreat with 2,4-D at 2 to 4 pt/A following spring application to control seedlings and escapes. Refer to label for adjuvant use. Add AMS at 4 lb/100 gal, or more for hard water. A4-7 B2 T4 T7 X1	<u>lb ae/gal</u>	<u>lb ai/gal</u>	<u>0.38 ae</u>	<u>0.75 ae</u>	<u>1.125 ae</u>	<u>1.5ae</u>	3	4	= 16 fl oz	32 fl oz	48 fl oz	64 fl oz	4/4.17	5.4/5.1	= 12 fl oz	24 fl oz	36 fl oz	48 fl oz	4.5	5.5	= 11 fl oz	22 fl oz	32 fl oz	44 fl oz	5	6.1	= 10 fl oz	20 fl oz	30 fl oz	40 fl oz
<u>lb ae/gal</u>	<u>lb ai/gal</u>	<u>0.38 ae</u>	<u>0.75 ae</u>	<u>1.125 ae</u>	<u>1.5ae</u>																													
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2,4-D amine	2 to 4 pt 4SL (1 to 2 lb ae)																																	

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SPURGE, LEAFY cont.

Herbicide	Product/A (ai/A)	Weed Location	When to Apply	Remarks and Paragraphs
Paramount + (quinclorac) Overdrive (dicamba & diflufenzopyr)	8 oz DF + 6 oz WDG (6 + 3 oz ae & 1.2 oz)	Noncropland.	Spring: True flower. Fall: Prior to frost.	Allow 7 days before haying. Add MSO-type adjuvant at 2 pt/A. Provides only suppression of leafy spurge. B7
Krenite (fosamine)	12 to 16 pt (6 to 8 lb)	Noncropland, adjacent to water and trees.	Spring: True flower growth stage. Fall: Early.	Inconsistent control. Best control with high humidity and good soil moisture. Do not contaminate water during application.
Rodeo / generic 4 lb ae/gal glyphosate approved for aquatic use	2 pt 4SL (0.75 lb ae)	Adjacent to water.	Mid-July to mid- September.	Use only registered glyphosate formulations. Apply with a NIS approved for use near water. Subsequent years: Control seedlings with a 2,4-D formulation labeled near water. A4-7 T8
2,4-D amine	2 to 4 pt 4SL (1 to 2 lb ae)		Leafy spurge: Actively growing.	Use only 2,4-D formulations labeled for use in or near water, such as Agrilience "AgriSolutions 2,4-D Amine 4", Nufarm "Weedar 64", UAP "Savage" and "Amine 4 2,4- D", or Van Diest "Navigate". T4-5 T8
Landmaster BW / generic glyphosate & 2,4-D	54 fl oz 2.4SL (0.38 & 0.63 lb ae)	Noncropland, pasture, and fallow.	Leafy spurge: Seed set stage or actively growing in fall.	Some grass injury and stunting may occur. Injury is greater with fall than spring treatments. Not to be used in consecutive years. A4-76 T8
Plateau (imazapic)	8 to 12 fl oz (2 to 3 oz ae)	Pasture, new or existing grass plantings in cropland, CRP or noncropland.	Early to mid September.	May be used on CRP, pasture, rangeland, industrial sites, roadside right-of-way or noncropland. Add MSO adjuvant at 1 qt/A + 28% UAN at 1 qt/A. Rates above 8 fl oz can reduce grass production, especially cool season species. Safe under most tree species but will cause temporary yellowing of spruce candles. See label for additional information. T13 T18
Casoron 4G Norosac 10G (dichlobenil)	150 to 200 4G 60 to 80 lb 10G (6 to 8 lb)	Trees.	Leafy spurge: Late Nov. to early March - before emergence.	Season long suppression only. Must be applied before leafy spurge emerges. No POST control.
Cultivation		Cropland.	Leafy spurge: 2 to 4 inches tall.	Leafy spurge will not survive intensive tillage. Repeat when plants are 2 to 4 inches tall. T5
			Late fall.	Cultivate when plants are 3 to 6 inches tall on fallow or post-harvest in September and again in October.
Biological Control	Insects and Grazing	CRP, pasture, rangeland and noncropland.	See narrative.	Several insects are available. Sheep and goats can be used for management of leafy spurge infestations. See narrative for additional information. T18

THISTLE, CANADA

Extension Bulletin W-799, "Perennial and Biennial Thistle Control" provides photos and additional information.

Herbicide	Product/A (ai/A)	Weed Location	When to Apply	Remarks and Paragraphs
Express / generic tribenuron	0.17 to 0.33 oz DF 0.25 to 0.5 SG	Wheat, barley and pasture.	Thistle: Rosette to pre-bud stage.	Apply with 2,4-D ester. Apply with NIS except when adding 2,4-D ester at 0.75 pt/A. A5-6 C18 T2 T6 Y1-2. Pages: 102-103, 104-105.
thifen & tribenuron 4:1 ratio 75DF Affinity T/M 50SG 3:1 Audit 75DF 2:1 ratio 75DF 1:1 ratio 75DF Affinity B/S 50SG	0.4 to 0.67 oz DF 0.6 to 1 oz SG 0.3 to 0.5 oz DF 0.3 to 0.66 oz DF 0.25 to 0.5 oz DF 0.4 to 0.8 oz SG	Provides a broader spectrum of control than either a.i. alone. Choose ratio based on prevalent weeds.		
MCPA or 2,4-D amine or ester	1.5 pt 4SL (0.75 lb ae) 1.33 pt 4EC (0.66 lb)	Wheat and barley.	Crop: Tiller stage.	Patch spray at higher rates may injure crop but may provide greater thistle control. Small grains are more tolerant to MCPA than 2,4-D. Suppression only. T6
2,4-D ester or amine	2 to 4 pt 4EC/SL (1 to 2 lb ae)	Fallow or post-harvest.	12 inches tall and actively growing.	Cultivate fallow until early July to achieve rosette stage at time of application. Spray in late August or September. Re-treatment necessary. Suppression only. T2. Pages: 102-103, 104-105.
	3 to 4 pt 4EC/SL (1.5 to 2 lb ae)	CRP, pasture, and rangeland or trees.		Apply only registered 2,4-D brands in CRP. Refer to paragraph for livestock grazing restrictions. Use only amine formulation in trees. Suppression only. T2 T4-6 T8. Pages: 102-103, 104-105.
Curtail M / generic clopyralid & MCPA	1.75 to 2.33 pt (0.09 to 0.122 & 0.5 to 0.68 lb ae)	Wheat, barley, and CRP.	Crop: 3-leaf to jointing.	Rosette technique: Products containing glyphosate or clopyralid fall-applied to Canada thistle in the rosette stage provides greater control than when applied to bolting or flowering stems. Refer to paragraph T2 for control of Canada thistle using the rosette technique. C7 T2 T6 T8. Pages: 102-103, 104-105, 108-110.
Curtail / generic clopyralid & 2,4-D	2 pt (0.09 & 0.5 lb ae)		Crop: 4-leaf through jointing.	
	4 pt (0.19 & 1 lb ae)	Fallow.	Thistle: Rosette until prior to bloom.	
	4 to 6 pt (0.19 to 0.29 & 1 to 1.5 lb ae)	CRP and pasture.		
Stinger / generic clopyralid	0.25 to 0.67 pt (0.09 to 0.25 lb ae)	Sugarbeet, wheat, barley, oat, corn.	Thistles: Rosette to pre-bud stage.	High rates in pasture is expensive but more effective. C7 M13 T2. Pages: 102-103, 104-105, 108-110.
	0.67 to 1.3 pt (0.25 to 0.5 lb ae)	CRP, pasture and rangeland.		
Hornet (flumetsulam & clopyralid)	2 to 5 oz WDG (0.37 to 0.09 & 1 to 2.5 oz ae)	Corn.	Corn: Up to 24 inches tall. Use drop nozzles on 20 to 24 inch corn.	Add a NIS at 0.25% v/v or oil adjuvant at 1% v/v. Refer to label for tank-mix options. C7 T2 Y2. Pages: 108-110, 102-103.
Banvel / generic dicamba	0.5 to 1 pt (0.25 to 0.5 lb ae)		Corn: POST up to 5 inches tall.	Do not apply more than 0.5 pt/A after corn is more than 5 inches tall. Can be applied 15 days prior to tasseling. C8 D8 T2 Y10. Pages: 102-103, 104-105, 108-110.
Distinct Overdrive (dicamba & diflufenzopyr)	6 oz WDG (3 oz ae & 1.2 oz)	Corn, fallow, and noncropland.	Corn: 4 to 24 inches tall.	Distinct is labeled in cropland. Overdrive is labeled in CRP, pasture, rangeland, and noncropland. Add NIS at 0.25% v/v + 28% UAN at 1.25 qt/A or AMS at 17 lb/100 gallons. Canada thistle suppression only. C8 D8 T2 Y10. Pages: 108-110, 102-103.
Basagran / generic bentazon	1 to 2 pt (0.5 to 1 lb)	Soybean and dry bean: Any stage. Field pea: More than 3 leaf pairs or 4 nodes.	Canada thistle: 6 to 8 inches tall.	Contact herbicide requiring thorough coverage. Add oil additive at 1 qt/A in two sequential applications. Rosette technique: Repeated in-crop applications control Canada thistle during the growing season but allow fall rosette growth. Refer to paragraph T2 for control of Canada thistle using the rosette technique. E3 T2

Pages 102-103 = Herbicides resistance, Pages 104-105 = Generic and commercial names, Pages 108-110 = Crop rotation restrictions.

THISTLE, CANADA cont.

Herbicide	Product/A (ai/A)	Weed Location	When to Apply	Remarks and Paragraphs																									
Roundup / generic glyphosate	Up to 2.25 lb ae. See Remarks.	Patches in corn, wheat, oat or soybean.	Prior to heading or flowering.	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">lb ae/gal</td> <td style="text-align: center;">lb ai/gal</td> <td style="text-align: center;">0.75 ae</td> <td style="text-align: center;">1.5 ae</td> <td style="text-align: center;">2.25 ae</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> <td style="text-align: center;">= 32 fl oz</td> <td style="text-align: center;">64 fl oz</td> <td style="text-align: center;">96 fl oz</td> </tr> <tr> <td style="text-align: center;">4/4.17</td> <td style="text-align: center;">5.4/5.1</td> <td style="text-align: center;">= 24 fl oz</td> <td style="text-align: center;">48 fl oz</td> <td style="text-align: center;">72 fl oz</td> </tr> <tr> <td style="text-align: center;">4.5</td> <td style="text-align: center;">5.5</td> <td style="text-align: center;">= 22 fl oz</td> <td style="text-align: center;">44 fl oz</td> <td style="text-align: center;">66 fl oz</td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">6.1</td> <td style="text-align: center;">= 20 fl oz</td> <td style="text-align: center;">40 fl oz</td> <td style="text-align: center;">60 fl oz</td> </tr> </table>	lb ae/gal	lb ai/gal	0.75 ae	1.5 ae	2.25 ae	3	4	= 32 fl oz	64 fl oz	96 fl oz	4/4.17	5.4/5.1	= 24 fl oz	48 fl oz	72 fl oz	4.5	5.5	= 22 fl oz	44 fl oz	66 fl oz	5	6.1	= 20 fl oz	40 fl oz	60 fl oz
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	Refer to label.	Roundup Ready Corn: Up to 30 inches tall/6 collars. Roundup Ready Soybean: Emergence to 14 day PHI. Roundup Ready canola: Prior to bolting.		Rosette technique: Glyphosate or clopyralid fall-applied to Canada thistle in the rosette stage provides greater control than when applied to bolting or flowering plants. Refer to paragraph T2 for control of Canada thistle using the rosette technique.																									
	Up to 2.25 lb ae. See Remarks.	Preharvest wheat, corn, soybean, field pea, and lentil.	Crop seed is physiologically mature. Thistle: At or beyond bud stage.	Refer to label for adjuvant use. Add AMS fertilizer at 4 lb/100 gal, or more for hard water. Avoid drift to non-target plants. Crop will be killed in treated area. A4-7 T2 T4-5 T7 X1. Pages: 102-103, 104-105.																									
		Fallow or post-harvest.	Canada thistle: Rosette or beyond bud stage.	Wait 3 or more days after application before tillage. A4-7 T2 T4-5 T7 X1. Pages: 102-103, 104-105.																									
		CRP, noncropland and around trees.		Avoid spraying tree foliage. A4-7 R1 T2 T4 X1																									
Banvel / generic dicamba	2 to 4 pt (1 to 2 lb ae)	Fall or post-harvest.	Thistle: At least 6 inches tall. Most effective when thistle is in the rosette stage.	May be tank-mixed at a lower rate with 2,4-D or glyphosate to reduce soil residue. Add NIS at 0.25% v/v to improve control. C8 D8 T2 T4-6 T10. Pages: 102-103, 104-105, 108-110.																									
	1 pt (0.5 lb ae)	CRP, pasture and rangeland.	Thistle: Rosette to 12 inches tall. Fall: Mid-summer mowing promotes active growth.	Consult label for grazing restrictions. NIS improves consistency of control. Cultivate fallow until early July to achieve rosette stage at time of application, followed by spray in late August or September.																									
	4 to 8 pt (2 to 4 lb ae)	Thistle patches in CRP, pastures, noncropland, and fallow.	Thistle: Rosette to prebud stage. Fall: Rosette following light frost but prior to a killing frost.	Retreatment necessary. Refer to label for additional information. T2 T10																									
Transline (clopyralid)	0.67 to 1.3 pt (0.25 to 0.5 lb ae)	Pasture, rangeland, and noncropland.		Add NIS at 0.25% v/v. Observe grazing restriction for lactating animals. T2 T13 T17																									
Milestone (aminopyralid)	5 to 7 fl oz (1.25 to 1.75 oz ae)	CRP, pasture, rangeland, and noncropland.		Apply up to 14 oz/A for spot treatment. Use low rate in fall, in low density stands, or areas with good grass stands. Fall application is more consistent than spring. Provides good control when applied in late-fall to freeze-up. Refer to label for grazing restrictions. Commercial mixture with 2,4-D available (ForeFront) to broaden spectrum of weed control. T12																									
Cimarron X-tra / generic chlorsulfuron & metsulfuron	0.5 to 2 oz DF (0.188 to 0.75 oz & 0.15 to 0.6 oz)			Apply with NIS at 0.25 to 0.5% v/v or PO at 1% v.v. T2 T11 X1 Y3																									
Tordon 22K (picloram)	0.5 to 2 pt (0.125 to 0.5 lb ae)	CRP, pasture, rangeland and fallow.	Thistle: At least 12 inches tall and actively growing.	Retreat at the same rate the following year. Addition of 2,4-D at 1 qt/A with Tordon at 1 pt/A may improve control. Mid-summer mowing promotes active growth for fall treatment. Mid-September is optimum fall application time and control decreases thereafter. Refer to label for additional information. T2 T15 Y16																									
		Patches of plants in CRP and pasture.	Thistle: Actively growing.	Consult reference for grazing restrictions. T2 T15																									

Pages 102-103 = Herbicides resistance, Pages 104-105 = Generic and commercial names, Pages 108-110 = Crop rotation restrictions.

THISTLES, BIENNIAL: BULL, MUSK, AND PLUMELESS

Extension Bulletin W-799, "Perennial and Biennial Thistle Control" provides photos and additional information.

Herbicide	Product/A (ai/A)	Weed Location	When to Apply	Remarks and Paragraphs																									
2,4-D	3 to 4 pt 4EC/SL (1.5 to 2 lb ae)	CRP, pasture, rangeland, and noncropland. (Refer to Remarks and Paragraphs for restrictions)	Late-fall or early spring when thistles are in the seedling to rosette stage.	Apply only registered 2,4-D brands in CRP.																									
2,4,D + Banvel / generic dicamba	2 pt 4EC/SL + 1 to 4 pt (1 + 0.5 to 2 lb ae)		Biennial thistles reproduce only by seed, so control prior to flowering will eventually eradicate infestations.	Add NIS at 0.25% v/v. Pages: 102-103, 104-105.																									
Cimarron X-tra / generic chlorsulfuron & metsulfuron	0.5 to 2 oz DF (0.188 to 0.75 oz & 0.15 to 0.6 oz)		Consult respective label for grazing restrictions.	Apply with NIS at 0.25 to 0.5% v/v or oil adjuvant at 1% v.v. T2 T11 X1 Y3. Pages: 102-103, 104-105.																									
Banvel / generic dicamba	1 to 2 pt (0.5 to 1 lb ae)			Add NIS at 0.25% v/v. Use high rate for patch treatment. Y10. Pages: 102-103, 104-105.																									
Curtail / generic clopyralid & 2,4-D	4 to 6 pt (0.19 to 0.29 & 1 to 1.5 lb ae)			See remarks for Redeem below. Pages: 102-103, 104-105.																									
Roundup / generic glyphosate	Up to 2.25 lb ae See Remarks.			<table border="1"> <thead> <tr> <th>lb ae/gal</th> <th>lb ai/gal</th> <th>0.75 ae</th> <th>1.5 ae</th> <th>2.25 ae</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>4</td> <td>= 32 fl oz</td> <td>64 fl oz</td> <td>96 fl oz</td> </tr> <tr> <td>4/4.17</td> <td>5.4/5.1</td> <td>= 24 fl oz</td> <td>48 fl oz</td> <td>72 fl oz</td> </tr> <tr> <td>4.5</td> <td>5.5</td> <td>= 22 fl oz</td> <td>44 fl oz</td> <td>66 fl oz</td> </tr> <tr> <td>5</td> <td>6.1</td> <td>= 20 fl oz</td> <td>40 fl oz</td> <td>60 fl oz</td> </tr> </tbody> </table> Non-selective, non-residual, foliar herbicide. Refer to label for adjuvant use. Add AMS fertilizer. A4-7 T2 T4 T6-7. Pages: 102-103, 104-105.	lb ae/gal	lb ai/gal	0.75 ae	1.5 ae	2.25 ae	3	4	= 32 fl oz	64 fl oz	96 fl oz	4/4.17	5.4/5.1	= 24 fl oz	48 fl oz	72 fl oz	4.5	5.5	= 22 fl oz	44 fl oz	66 fl oz	5	6.1	= 20 fl oz	40 fl oz	60 fl oz
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Milestone (aminopyralid)	3 to 5 oz (0.75 to 1.25 oz ae)	Spring: Rosette to bolting plants. Fall: Seedlings and rosette plants.	Use higher rate on plants in late-bolt to flowering growth stages and/or dense stands. Commercial mixture with 2,4-D available (ForeFront) to broaden spectrum of weed control. Refer to label for grazing restrictions. T12 Z1																										
Overdrive (dicamba & diflufenzopyr)	6 oz WDG (3 oz ae & 1.2 oz)		Labeled only in noncropland. Add NIS at 0.25% v/v.																										
Transline (clopyralid)	0.33 to 1.33 pt (0.125 to 0.5 lb ae)		Transline is not labeled for use in CRP. Very effective but more expensive than other treatments.																										
Tordon 22K (picloram) RUP	0.5 to 2 pt (0.125 to 0.5 lb ae)		Use high rate for patch treatment. Apply up to 2 pt/A broadcast and up to 4 pt/A for spot treatment.																										
Tordon 22K (picloram) + 2,4-D RUP	1 + 2 pt 4EC/SL (0.125 + 1 lb ae)		Apply only registered 2,4-D brands in CRP.																										

Pages 102-103 = Herbicides resistance, Pages 104-105 = Generic and commercial names, Pages 108-110 = Crop rotation restrictions.

TOADFLAX, DALMATIAN AND YELLOW

Extension Bulletin W-1239, "Dalmatian and Yellow Toadflax Identification and Control" provides photos and information.

Herbicide	Product/A (ai/A)	Weed Location	When to Apply	Remarks and Paragraphs
Plateau (imazapic)	12 fl oz (3 oz ae)	CRP, pasture, rangeland, and noncropland.	After hard frost when 25% of foliage is necrotic.	FOR DALMATIAN TOADFLAX ONLY. Applications prior to hard frost may result in poor control. Add MSO-type adjuvant at 1 qt/A. Retreat as necessary.
Telar / generic chlorsulfuron	2 to 3 oz DF (1.5 to 2.25 oz)	Pasture and noncropland.	PRE to early POST.	FOR DALMATIAN TOADFLAX ONLY. Apply at 25 gpa or more and add NIS at 0.25% v/v. Retreat as necessary.
Tordon 22K (picloram) RUP	2 to 4 pt (0.5 to 1 lb ae)	CRP, pasture, rangeland, and noncropland.	Toadflax: Actively growing through full bloom.	Use maximum rate for yellow toadflax. Apply 2 pt/A for broadcast and 4 pt/A for spot spray. Retreat as necessary. Y16
Tordon 22K + Overdrive (picloram + dicamba & diflufenzopyr) RUP	2 pt + 6 oz WDG (16 oz ae + 3 oz ae & 1.2 oz)		Toadflax: Mid-summer during flowering or in Fall prior to frost.	NIS at 0.25% v/v improves weed control. Overdrive greatly improves long-term yellow toadflax control. T4 T15-16 Y16

WORMWOOD, ABSINTH

Extension Circular W-838, "Absinth Wormwood Control" provides additional information.

Herbicide	Product/A (ai/A)	Weed Location	When to Apply	Remarks and Paragraphs																														
2,4-D	4 pt 4EC/SL (2 lb ae)	CRP, pasture, rangeland, noncropland, trees, fallow, or post- harvest.	Apply when plants are at least 12 inches tall and actively growing.	Apply only registered 2,4-D brands in CRP. Plants are controlled slowly. Do not graze dairy cows for 7 days after treatment. Use amine formulation near trees. T8																														
Banvel / generic dicamba	1 to 2 pt (0.5 to 1 lb ae)		Herbicides applied in late-June to mid- August have given greater residual control than fall or spring applications.	DO NOT apply near trees. Apply with NIS at 0.25% v/v. Observe grazing restrictions. T10 Y10																														
Curtail / generic clopyralid & 2,4-D	2 pt (0.09 & 0.5 lb ae)	Cropland.	Plants can be mowed in early to mid-summer to promote active regrowth prior to fall treatment.	Do not apply to new seedings of grass. Do not cut treated grass for hay within 30 days PHI. Consult label for grazing restrictions. C8 D8. Pages: 102-103, 104-105, 108-110.																														
Milestone (aminopyralid)	3 to 5 oz (0.75 to 1.25 oz ae)	CRP, pasture, rangeland and noncropland.		Use higher rate when plants are taller than 12 inches. Commercial mixture with 2,4-D available (ForeFront) to broaden spectrum of weed control. Refer to label for grazing restrictions. T12																														
Tordon 22K (picloram) RUP	0.5 to 2 pt (0.125 to 0.25 lb ae)			0.5 pt/A is the most cost-effective. Apply 4 pt/A for spot treatment. Refer to paragraph for grazing restriction. Use high rate for dense stands. T15 Y16																														
Roundup / generic glyphosate	Up to 1.125 lb ae. See Remarks.	Trees, noncropland, fallow or post-harvest.		<table border="0"> <tr> <td><u>lb ae/gal</u></td> <td><u>lb ai/gal</u></td> <td><u>0.38 ae</u></td> <td><u>0.57 ae</u></td> <td><u>0.75 ae</u></td> <td><u>1.125ae</u></td> </tr> <tr> <td>3</td> <td>4</td> <td>= 16 fl oz</td> <td>24 fl oz</td> <td>32 fl oz</td> <td>48 fl oz</td> </tr> <tr> <td>4/4.17</td> <td>5.4/5.1</td> <td>= 12 fl oz</td> <td>18 fl oz</td> <td>24 fl oz</td> <td>36 fl oz</td> </tr> <tr> <td>4.5</td> <td>5.5</td> <td>= 11 fl oz</td> <td>16 fl oz</td> <td>22 fl oz</td> <td>32 fl oz</td> </tr> <tr> <td>5</td> <td>6.1</td> <td>= 10 fl oz</td> <td>15 fl oz</td> <td>20 fl oz</td> <td>30 fl oz</td> </tr> </table> <p>Avoid spraying tree foliage. Add AMS fertilizer at 4 bl/100 gal, or more for hard water. Refer to label for adjuvant use. Use the high rate for dense stands. A4-7 T7 X1</p>	<u>lb ae/gal</u>	<u>lb ai/gal</u>	<u>0.38 ae</u>	<u>0.57 ae</u>	<u>0.75 ae</u>	<u>1.125ae</u>	3	4	= 16 fl oz	24 fl oz	32 fl oz	48 fl oz	4/4.17	5.4/5.1	= 12 fl oz	18 fl oz	24 fl oz	36 fl oz	4.5	5.5	= 11 fl oz	16 fl oz	22 fl oz	32 fl oz	5	6.1	= 10 fl oz	15 fl oz	20 fl oz	30 fl oz
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