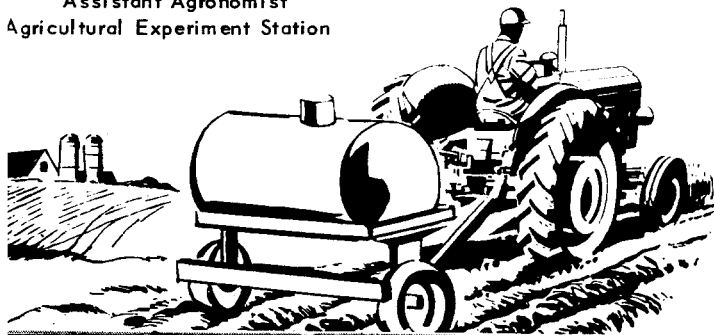


L. A. Jensen  
Agronomist

Larry W. Mitich  
Assistant Agronomist

John D. Nalewaja  
Assistant Agronomist  
Agricultural Experiment Station



EXTENSION SERVICE  
NORTH DAKOTA STATE UNIVERSITY  
OF AGRICULTURE AND APPLIED SCIENCE

# CHEMICAL WEED CONTROL

## in Field Crops and for Perennial Weeds

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These chemical weed control recommendations are based on information available from the North Dakota Agricultural Experiment Station and the Research Committee of the North Central Weed Control Conference.

### CAUTION:

It is essential that food and feed products contain no herbicide residues. Use only chemicals registered by the Federal Food and Drug Administration. Detailed research has been conducted on all registered herbicides. This insures that when registered chemicals are applied as directed, residues on crops will be within the established tolerance. Use each chemical only as recommended on the label of the container.

Recommended rates are based on active ingredient or acid equivalent unless otherwise indicated. For example, 1 pint of 2,4-D (4 pounds 2,4-D acid per gallon) equals 1/2 pound of 2,4-D acid equivalent and 1 pound of dalapon powder equals 3/4 pound acid equivalent.

**SELECTIVE HERBICIDES** can be an effective supplement to good cultural practices in controlling weeds in field crop production. Timely applications of selective chemicals at the recommended rates will control many annual weeds satisfactorily without damaging the crop in which the weeds are growing. Perennial weeds such as field bindweed, leafy spurge, Canada thistle and perennial sowthistle in crops also can be controlled with chemicals.

To avoid crop injury and get good weed control, follow closely the instructions on the container. Consider both the crop tolerance and kind of weeds present in determining the rate to use.

Timely application of herbicides in growing crops is important. Weed competition reduces crop yield

severely, unless weeds are removed early.

Do not spray when there is danger of drift, or when winds are blowing toward a neighboring crop or planting more susceptible than the crop being sprayed. Ideal temperatures for spraying are 65 to 85 degrees. Below 60 degrees, weeds are killed very slowly; above 90 degrees there is danger of crop injury.

Weeds more susceptible to 2,4-D than MCPA include Russian thistle, false flax, wild buckwheat, smartweed, redroot pigweed, ball mustard, flixweed and sowthistle.

Use the higher suggested rate of chemical when spraying for several kinds of weeds in one crop. For hard-to-kill weeds, rates higher than suggested may be required even though some spray injury to the crop may result. The lower rates of chemical are suggested only when growth is rapid or when very susceptible weeds are being sprayed.

**PREEMERGENCE HERBICIDES** in North Dakota and other Great Plains states have given erratic and undependable results in selective weed control. Performance varies from year to year and field to field. Good weed control depends on many factors including soil moisture, soil temperature, rainfall after application and soil type. For these reasons, preemergence chemicals applied on the soil surface are generally unsatisfactory. Those that can be mixed into the surface soil have a better chance for success.

**PERENNIAL WEEDS** are long lived and persistent. Choice of chemical depends on the size of area to be treated and on whether it is to be cropped. Successful control requires thorough followup. Noxious weeds may re-establish quickly if some plants escape being sprayed or if the area contains numerous seeds. Seedlings are easily controlled with 2,4-D.

**CHEMICAL WEED CONTROL**  
**For Field Crops**

CROP	HERBICIDE	ACT. INGRED. LB/A	WEEDS	WHEN TO APPLY	REMARKS
WHEAT, DURUM or BARLEY <sup>1/</sup>	2,4-D amine	1/4 to 1/2	Broadleaf	Crops--5th leaf to early boot	Apply not later than boot stage. Barley more sensitive than wheats.
	2,4-D ester	1/4 to 1/3			
	MCPA	1/4 to 1/2	Broadleaf	Crops--emergence to early boot	Can be applied much earlier than 2,4-D.
WHEAT or DURUM	Dicamba (Banvel D)	1/8	Wild buckwheat	Crop--2nd through 4th leaf stage	Mix with 4 to 6 oz/A of MCPA for control of broadleaf weeds. (Commercial mixtures are available-- Banvel M and MAD.)
WINTER WHEAT	2,4-D amine	1/4 to 1/2	Broadleaf	Crops--fully tillered to early boot	Fall application not recommended.
RYE	2,4-D ester	1/4 to 1/3			
OATS <sup>1/2/</sup>	MCPA	1/4 to 1/2	Broadleaf	Oats--emergence to early boot	Early jointing stage most sensitive. Do not spray oats unless necessary.
FLAX <sup>1/2/</sup>	MCPA amine	1/4 or less	Broadleaf	Flax 2 to 6 in. tall	Use higher rates or esters only for hard-to-kill weeds.
	Dalapon (Dowpon)	3/4	Annual grass not w. oats	Best results obtained when flax is over 2 in. and weeds are under 2 in. tall.	Mix MCPA or 2,4-D <sup>2/</sup> with dalapon or TCA and apply at about 4/5 normal rate per acre to control both broadleaf and annual grassy weeds. Legumes not injured by dalapon or TCA.
	TCA	5			
SMALL GRAIN PRE-HARVEST	2,4-D ester	1	Broadleaf	Crop--early dough stage	Use only when weeds threaten to interfere with harvest operations.
SORGHUM	2,4-D amine	1/4 to 1/2	Broadleaf	Sorghum--4 to 12 in. tall	Preemergence herbicides such as CDAA and pro-pazine are available but give erratic control.
CORN	CDAA (Randox)	4	Annual grass not w. oats	Preemergence	Erratic results success depends on rainfall. Band application reduces cost.
	2,4-D	1 to 1-1/2	Broadleaf and grass--not w. oats		
	Atrazine	2 to 4	Broadleaf and grass	Preemergence	Atrazine may remain in soil longer than one year and may damage following crops other than corn.
	2,4-D amine	1/4 to 1/2	Broadleaf	Postemergence, corn--3 in. to tassels.	Use drop nozzle when corn is over 8 inches tall.
	2,4-D plus dalapon	1/2 1-1/2	Broadleaf and grass	Postemergence directed--corn 8-20 in. tall	Use directed spray equipment with leaf lifters. Apply in a 14-inch band over the row. Spray no higher than the lower half of stalk (ground to whorl) or no higher than bottom 7 inches of stalk.
	Linuron (Lorox)	2	Broadleaf and annual grass	Postemergence directed--corn over 15 in. and weeds under 8 in. tall.	Use wetting agent to increase effectiveness.
SOYBEANS	CDAA (Randox)	4 to 5	Annual grass not w. oats	Preemergence	Band application reduces cost. Results have been erratic. Amiben can be used on pinto beans at 2 lb/A.
	Amiben	2 to 3	Annual grass and broadleaf		
SUGARBEETS (See later section for wild oat control)	Dalapon	3	Annual grass not w. oats	After weeds are up	Apply while beets are small.
	TCA	5 to 7	Annual grass not w. oats	Preemergence	Do not use tops for livestock feed.
	Endothall	1 to 2	Wild buckwheat	Beets--3-6 leaf and weeds emerged	Do not apply more than 40 days after beet emergence.
GRASS seedling	2,4-D	1/2 to 3/4	Broadleaf	After 3-leaf stage	Heavier rates may be used after grass is well tillered.
Established	2,4-D	3/4 and up	Broadleaf	Weeds--emergence to bud stage	Apply when weeds are susceptible.
	Dicamba (Banvel D)	1/4 to 1/2	White cockle, n. flowering catchfly & alfalfa	In spring when seed crop is 2 to 4 in. high	Use only in established perennial grasses grown for seed.
LEGUMES Alfalfa & clover with nurse crop	2,4-DB	1/2 to 1	Broadleaf	Not before legumes are 2 in. tall	Sweetclover injured.
	MCPA or 2,4-D amine	1/8 to 1/4			Delay to get weed and crop canopy. Possible injury to sweet clover and alfalfa.
Alfalfa, trefoil or sweet clover alone. Established or seedling stage.	Dalapon	3/4 to 1	Annual grass not w. oats	Weeds 1 to 2 in. tall	Seedling or old stands not for hay or pasture. Do not use with small grain nurse crop. Second year sweet clover may be injured.
	TCA	5	Annual grass not w. oats		
	2,4-DB	1/2 to 1	Broadleaf	When weeds are small	2,4-DB and dalapon can be mixed but no dalapon label clearance for hay or pasture. 2,4-DB must be applied 30 days before hay harvest or grazing.
CROP	HERBICIDE	RATE/A	CROP	WHEN TO APPLY	REMARKS
WILD OATS Selective control in crops	Triallate (Far-go)	1-1/4 lb	Barley	Immediately after planting	Apply on smooth soil surface and incorporate in top 2 inches by cultivation.
		1 lb	Wheat & durum		
	Diallate (Avadex)	1-1/2 lb	Flax, sugarbeets, potatoes & safflower	Preplanting	Kills wild oats in soil for about 6 weeks.
			Corn & peas	Preplanting or preemergence	
	Barban (Carbyne)	4 to 6 oz	Wheat, durum, barley, flax, peas, mustard & safflower	Wild oats--1-1/2 leaf stage	Usually applied 4 to 9 days after wild oats emerge. Must apply before the 14th day and before sm. grain reaches 4th leaf stage to avoid serious crop injury and poor w. oat control. Use the higher rate only when growing conditions are not favorable.
		12 to 16 oz	Sugarbeets	Crops: sm. gr. before 4th leaf stage flax before 12th leaf stage peas before 6th leaf stage safflower before 8th leaf stage mustard before true 3-leaf stage	

<sup>1/</sup>When used as a nurse crop for legumes or grasses, see later sections.

<sup>2/2</sup> 2,4-D is not recommended unless such hard-to-kill weeds as Russian thistle, wild buckwheat, smartweed, pigweed or sowthistle are present.

**CHEMICAL WEED CONTROL**  
**For Perennial Weeds**

WEED	HERBICIDE <sup>1/</sup>	ACT. INGRED. LB/A OR SQ RD	WHEN TO APPLY	REMARKS
FIELD BINDWEED (Creeping Jenny) On fallow	2,4-D for large areas	3/4 lb/A	Bud to bloom or fall	Cultivate fallow until mid-July, then spray. Respray in following year's crop.
Patches or individual plants	Benzabor	1 to 1-1/2 lb/sq rd	Late fall or early spring	Apply dry--long soil sterility.
	TBA (Benzoic)	10-20 lb/A	Bud stage	Residual effect 1 year or more.
	Picloram (Tordon)	1 to 2 lb/A	When bindweed is actively growing	Vegetation may not grow in treated area for some time.
	Dicamba (Banvel D)	5 to 8 lb/A	When weed is actively growing	Apply to foliage and/or soil.
LEAFY SPURGE Fallow year	2,4-D ester for large areas	1 lb/A	Early bud stage and fall	No cultivation before spraying. Apply both spring and fall. Respray in following year's crop.
Patches or individual plants	AMS (Ammate X) <sup>2/</sup>	1/2 to 1 lb/sq rd	Summer	Use 2,4-D when seedlings appear.
	2,4-D	40 lb/A	After Sept. 20	No permanent injury to perennial grasses.
	Dicamba (Banvel D)	5 to 10 lb/A	When spurge is actively growing	Apply to foliage and/or soil.
	TBA (Benzoic)	20 lb/A	Bud stage	Residual 2 years or more.
	Benzabor	1 to 1-1/2 lb/sq rd	Late fall or early spring	Apply dry--long soil sterility.
CANADA THISTLE	Amitrole Amitrole-T <sub>1</sub>	4 lb/A	Pre-bud stage	Wet thoroughly.
	Dicamba (Banvel D)	5 to 10 lb/A	When weed is actively growing	Apply to foliage and/or soil.
	Picloram (Tordon)	1 to 2 lb/A	When thistles are actively growing	Lower rate effective in fall.
SOWTHISTLE, CANADA THISTLE, RUSSIAN KNAP- WEED <sup>3/</sup> & HOARY CRESS (P. PEPPER- GRASS)	TBA (Benzoic)	10 to 20 lb/A	Bud stage	Not effective against hoary cress. Residual effect 2 years or more.
	Benzabor	1-1/2 lb/sq rd	Late fall or early spring	Apply dry--long soil sterility.
QUACKGRASS On fallow Patches	Dalapon	5 to 10 lb/A	Spring after 4 to 6 in. growth	Cultivate after 2 to 3 weeks.
	Dalapon	20 to 25 lb/A	4 to 10 in. growth	Use where cultivation after treat- ment is not possible. There will be a residual effect.
	Amitrole-T	4 to 8 lb/A	Actively growing	Cultivate after 3 weeks.
AROUND BLDGS., TELEPHONE POLES, ETC.	Monuron, atrazine, bromacil or similar products	See label	Anytime--all weeds	Use heavy rates for complete longtime soil sterility.

<sup>1/</sup>Several soil sterilants will do a very good job of perennial weed control. Follow directions of the manufacturer as they appear on the label.

<sup>2/</sup>A spreader sticker must be used for effective control.

<sup>3/</sup>Picloram at 2 lb/A or dicamba 5 to 8 lb/A can also be used for Russian knapweed control.

## GLOSSARY OF CHEMICAL NAMES

Common Name	Chemical Name	Trade Name <u>1/</u> and Manufacturer
Amiben	3-amino-2,5-dichlorobenzoic acid	Amiben (Amchem Products)
Amitrole	3-amino-1,2,4-triazole	Amino Triazole Weed Killer (American Cyanamid) Weedazol (Amchem Products)
Amitrole-T	3-amino-1,2,4 triazole-ammonium thiocyanate	Amitrol-T (Amchem Products) Cytrol (American Cyanamid)
AMS	Ammonium sulfamate	Ammate X (DuPont)
Atrazine	2-chloro-4-ethylamino-6-iso- propylamino-s-triazine	Atrazine Dow (Greigy)
Barban	4-chloro-2-butynyl N-(3 chloro- phenyl carbamate)	Carbyne (Spencer)
Bromacil	5-bromo-3-sec-butyl-6-methyluracil	Hyvar X (DuPont)
CDA	2-chloro-N, N-di allylacetamide	Randox (Monsanto)
Dalapon	2,2-dichloropropionic acid	Dowpon (Dow)
Diallate	2,3-dichlorallyl diisopropyl- thiocarbamate	Avadex (Monsanto)
Dicamba	2 methoxy-3,6-dichloro- benzoic acid	Banvel D (Velsical)
Dicamba-MCPA Mixtures	2 methoxy- 3,6-dichloro- benzoic acid-2 methyl- 4-chloro-phenoxyacetic acid mixture	Banvel M (Velsical) MAD (Agasco)
Endothall	Disodium 3,6-endoxohexahydro- phthalate	Endothal, Aquathal (Pennsalt)
Linuron	3-(3,4-dichlorophenyl) -1-methoxy-1- methylurea	Lorox (DuPont)
MCPA	2 methyl-4-chlorophenoxyacetic acid (amine salts and esters)	Amine salts--Various Ester--MX (Agasco)
Monuron	3-(p-chlorophenyl)-1,1- dimethylurea	Telvar (DuPont)
Picloram	4-amine-3,5,6-trichloropicolinic acid	Tordon (Dow)
TBA	2,3,6-trichlorobenzoic acid	Various
TBA - Sodium borate mixture	Sodium borate-2,3,6-TBA mixture	Benzabor (U. S.-Borax)
TCA	Sodium trichloroacetate	Various
2,4-D	2,4-dichlorophenoxyacetic acid (sodium and amine salts and esters)	Various
2,4-DB	4-(2,4-dichlorophenoxy) butyric acid (amine salts and esters)	Butyrac 118 (Amchem Products) Butoxone (Chipman)

1/The mention of trade names does not imply that they are endorsed or recommended over those of similar nature not listed.

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