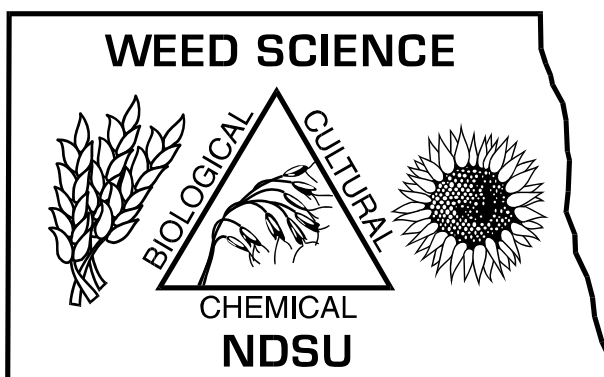


2019 NORTH DAKOTA WEED CONTROL GUIDE



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www.ndsu.edu/weeds/

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WEED GUIDE INFORMATION

The information in this guide provides a summary of herbicide uses in crops grown in North Dakota and is based on federal and state herbicide labels, research at ND Ag. Experiment Stations, and information from the North Dakota Department of Agriculture.

ALWAYS READ AND FOLLOW LABEL DIRECTIONS.

Instructions for registered uses of herbicides are given on container labels. The label is the final guide and should be strictly followed. The information in this guide only applies to North Dakota because some herbicide uses are allowed only by supplemental or specific ND labeling. Label possession is required at the time of application.

This bulletin is provided for your information. North Dakota State University or its officers or employees make no claims, representations, or guarantees as to product performance nor accept responsibility for results from using herbicides. See legal disclaimer on the next page.

Below is information to aid in using this guide:

Herbicides. Herbicides in tables are listed by trade name followed by common name in parenthesis except where several brands are available. Contact chemical suppliers and the ND Dept of Ag for new label information.

Rates. Rates in tables are based on broadcast application and are expressed according to formulated product per acre with active ingredient (ai) or acid equivalent (ae) per acre given in parentheses. Commercial formulations of the same ai may vary in concentration.

For example, a pint of 4 lb ae/gal 2,4-D contains 0.5 lb while a pint of 6 lb ae/gal 2,4-D contains 0.75 lb or a quart of 3 lb ae/gal glyphosate contains 0.75 lb while a quart of 4.5 lb ae/gal glyphosate contains 1.125 lbs.

What is the difference between ai and ae? The ai of glyphosate is the weight of both glyphosate acid plus the salt formulated with the glyphosate molecule. The acid equivalent (ae) of glyphosate is only the weight of glyphosate without the salt. The label of commercial products list both active ingredient (ai) and inert ingredients. Inert ingredients are not phytotoxic but are used to create stable formulations and to aid in application, herbicide retention, deposition, and absorption. The active ingredient of some herbicides are formulated with salts or esters (See Herbicide Compendium). Glyphosate is formulated at different concentrations, as pure acid, and with five salts, isopropyl amine (ipa), dimethyl amine (dma), ammonium, diammonium (2(NH₃)), and potassium (K). The salt formulated with herbicide molecules does not contribute to weed control. Glyphosate formulated at different concentrations and with different salts require using acid equivalent (ae) when calculating rates. The following table gives the relationship between ae and active ingredient (ai).

Table. Glyphosate product rates based on ae and ai formulation concentrations.

lb ae or ai/gallon	Rate as acid equivalent (ae)			
	0.75	1.125	1.5	2.25
3 lb ae = 4 lb ai =	32	48	64	96
3.75 lb ae = 5 lb ai =	25.6	38.4	51.2	76.8
4 lb ae = 5.4 lb ai =	24	36	48	72
4.17 lb ae = 5.1 lb ai =	23	34.5	46	69
4.5 lb ae = 5.5 lb ai =	21.3	32	42.6	64
4.72 lb ae = 6.3 lb ai =	20.3	30.5	40.7	61
5 lb ae = 6.1 lb ai =	19.2	28.8	38.4	57.6


Weed Control Ratings. Herbicide effectiveness ratings listed in tables show general comparative ratings based on field observations. Weed control may be equal or greater than what is indicated in the table under favorable conditions or may be reduced and unsatisfactory may result in unfavorable conditions.

Abbreviations Used

Units of Measurement

oz	= ounce (16 oz/lb)
fl oz	= fluid ounce (128 fl oz/gal)
pt	= pint (8 pt/gal)
gal	= gallon
ae	= acid equivalent
ai	= active ingredient
conc	= concentration
v/v	= volume/volume
lb, lb/gal	= pound, pounds/gallon
gpa	= gallons per acre

Type of Application

EPP	= Early preplant
PPI	= Preplant incorporated
PRE	= Preemergence
EPOST	= Early postemergence
POST	= Postemergence
POST Directed	= Postemergence directed
	= Aerial application prohibited

Herbicide Group Numbering

Herbicide name^{number 1-30} = herbicide site of action group - see pages 100-101

Types of Formulation

DF	= Dry flowable
EC	= Emulsifiable concentrate
F	= Flowable
G	= Granule
ME	= Micro-encapsulated
OD	= Oil dispersion
S/SL	= Solution/Soluble Liquid
SC	= Suspension "Suspo" concentrate
SE	= Solution emulsion
SG	= Soluble granule
WDG/XP	= Water dispersible granule
ZC	= Suspension of microcapsules and solid fine particles

Miscellaneous

ACCCase	= Acetyl CoA carboxylase
ALS	= Acetolactate synthase
AMS	= Ammonium sulfate
DAA	= Days after application
IMI	= Imidazolinone
MSO	= Methylated seed oil
NIS	= Nonionic surfactant
OM	= Organic matter
PHI	= Preharvest interval
RUP	= Restricted Use Pesticide
SU	= Sulfonylurea
UAN	= Urea ammonium nitrate

GENERAL INFORMATION

LEGAL DISCLAIMER

The weed control suggestions presented in this guide are based on Federal label clearance, on information obtained from the North Dakota Agricultural Experiment Station, and reports in North Dakota Weed Control Research.

CAUTION: Instructions for registered uses of herbicides are given on container labels. **Read and follow label instructions carefully.** Pesticide labels supersede recommendations given in this guide. Weed control suggestions in this guide are based on the assumption that all herbicides mentioned will continue to have a registered label with the Environmental Protection Agency. This guide may contain recommendations for herbicides that are labeled only for North Dakota. The user of any pesticide must possess a copy of the label at the time of application. State labels can be obtained from chemical dealers or distributors or found on the NDDOA web site at: <http://www.kellysolutions.com/nd>

Use pesticides only on registered crops. Some formulations of an active ingredient may not be labeled for certain uses. Federal law makes liable for seizure any raw agricultural commodity that possesses a pesticide residue for which no exemption or tolerance has been established or that exceeds the tolerances established by the Food and Drug Administration. Persons using pesticides in a manner contrary to label instructions are subject to penalty under federal and state laws. North Dakota State University or its officers or employees makes no claims or representations that the chemicals discussed will or will not result in residues on agricultural commodities and assume no responsibility for results from using herbicides.

USE PESTICIDES ONLY AS LABELED.

Pesticide Labeling and Registration

No pesticide may be sold or used in the United States until the U.S. Environmental Protection Agency (EPA) has registered and approved the product use and the labeling. Canadian and other foreign labeled pesticides may not be used in the United States until registered by the EPA.

TYPES OF PESTICIDE REGISTRATIONS

Federal EPA Registrations, also known as 3e and 2ee labels, are the most common and widely used type of pesticide registration. Product labels of pesticides being applied must be at the application site during the time of application. Aerial applicators must have the label at the loading site.

Section 24(c) Registrations, also known as (SLN) State Local Needs registrations:

- are state-specific registrations issued by states
 - are used to address a special local need
 - must prove there is an existing or imminent pest problem for which a federally registered pesticide is not available
 - can be used to address pest resistance management.
- SLN registrations can be used to register additional uses or add limitations for a federally registered pesticide, like adding application sites, pests, or alternate control methods to those listed on federally registered labeling. SLN labels are initiated by the ND Department of Ag and must be approved by EPA.

Supplemental labeling must be provided for each SLN registration. Applicators must have the SLN label and federal label in their possession at application. These registrations are legal only in the state or local area specified in the labeling.

Section 18 “Emergency” and “Crisis” exemptions from FIFRA allows the unregistered use of a pesticide to address an emergency pest situation and are used when a crisis pest situation:

- is an emergency and non-routine
- has no or ineffective alternative management tools and
- is severe and can be documented to cause yield or economic loss (>20%) on the specified crop.

Both types of exemptions from registration allows use of a pesticide for a non-registered purpose for a specified period of time. ND “Emergency” Section 18 exemptions are registrations initiated by the NDDA, are approved by the EPA, and can be declared if both federal and SLN registrations are not or cannot be enacted in time to prevent the condition. In rare occasions, when time is critical and the emergency is acute, NDDA can declare a “Crisis” exemption without written approval of EPA. The NDDA informs EPA of the condition prior to the action and allows EPA to support the state action. This process usually takes 10 to 14 days to complete. The duration of a “Crisis” exemption (14 to 21 days) is shorter than an “Emergency” exemption. If an “Emergency” exemption is being reviewed by the EPA at the time the “Crisis” exemption is declared the EPA may elect to grant the “Emergency” exemption and increase the period of duration. An applicator must possess federal labels and Section 18 exemption labeling at application.

RESTRICTED USE PESTICIDES (RUP)

EPA categorizes pesticides as either unclassified (general use) or restricted. **Restricted-Use Pesticides (RUP)** are pesticides that can cause harm to humans or environment and must be applied by certified applicators. Only certified dealers may sell RUPs and only certified applicators may purchase, or apply an RUP. Private and commercial/public applicators must record certain information for all pesticide applications.

RESTRICTED USE HERBICIDES:

All products and premixes containing the active ingredients listed below are restricted use pesticides. See Mode of Action table in Section X1.

Atrazine = See Mode of Action #5

Isoxaflutole = See Mode of Action #27

Paraquat = See Mode of Action #22

Picloram = See Mode of Action #4

Sulfuric acid

Brand names of other RUP:

Amitrole-T, Cytrale (amitrole)

Dicamba: **Engenia, Fexapan, XtendiMax.** See Mode of Action #4

Huskie Complete = See Mode of Action #2, 6, 27

Kerb 50W (pronamide)

SAFETY AND EMERGENCY PHONE NUMBERS:

ND Poison Control Line: 800 222-1222

ND Emergency Assistance Line: 800 472-2121

Report pesticide incident to NDDA: 701 328-2232