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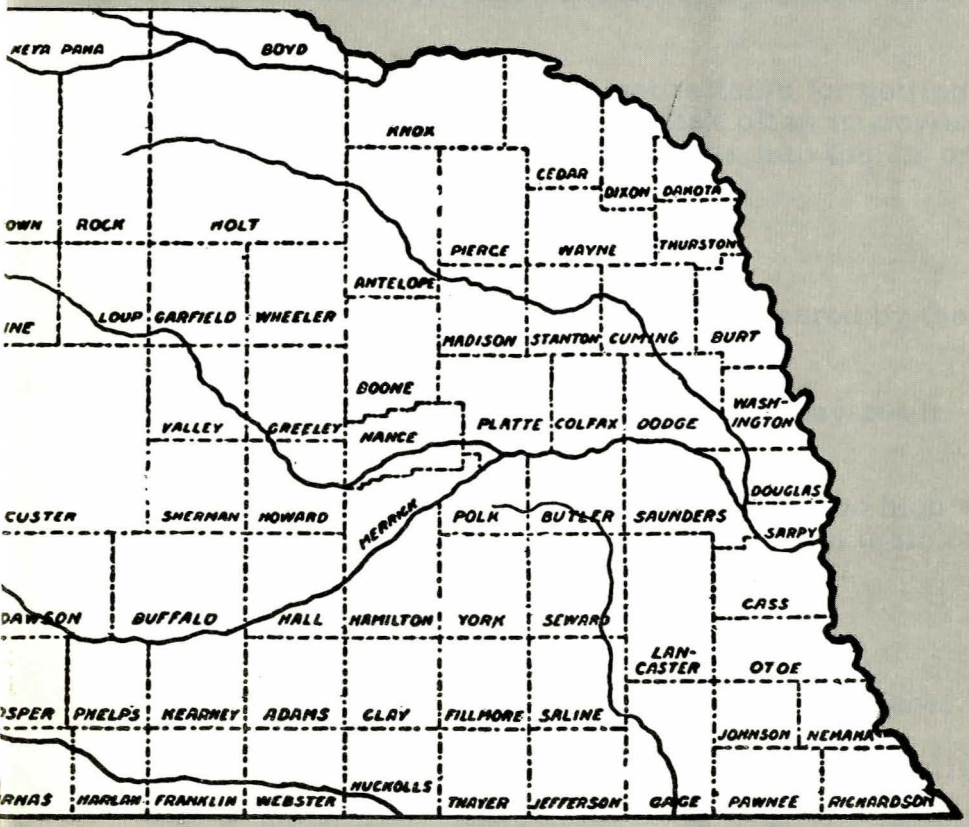
WEEDING with PREEMERGENCE HERBICIDES in Eastern Nebraska



UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE AND HOME ECONOMICS
EXTENSION SERVICE
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E. F. FROLIK, DEAN J. L. ADAMS, DIRECTOR

Weeding With Preemergence Herbicides in Eastern Nebraska

L. R. Robison[1/], C. R. Fenster[2/] and G. A. Wicks[3/]

The use of preemergence herbicides is increasing in Nebraska. About 20% of corn acreage, 15% of sorghum acreage and 30% of soybean acreage is now treated with a preemergence herbicide.

Preemergence herbicides are chemicals applied to soil before crops or weeds emerge. Usually herbicides do not injure crops but they do kill weeds.

Seeds of most weeds that emerge are in the top two inches of soil. Herbicides must be put into soil to some extent with rainfall or mechanically (i.e., tandem disk, etc.).

In Nebraska rainfall is often not reliable for getting herbicides into the soil. Use of a disk often improves weed control by preventing herbicide loss into the air or breakdown by sunlight.

If you use preemergence herbicides:

Use only herbicides which have been cleared by the FDA for crop use.

Use herbicides only on crops for which they are intended.

Use the manufacturer's suggested rates. Too high a rate may cause crop injury or illegal residues in grain or forages; too little may fail to control the weeds.

Use recommended time of application.

Wear protective clothing as recommended on the label.

Store herbicides in a place where children or pets will not become exposed.

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Advantages of Preemergence Herbicides.

It is easier to kill young weeds than old, tough weeds.

Weeds are destroyed before they compete with crops. The first four weeks after planting is one of the most important periods for weed control. This is when the crop is getting established.

Weeds are controlled when your soil is too wet to cultivate. Rainfall often occurs when a crop needs to be cultivated. Preemergence herbicides offer a method of control even during adverse weather when cultivation may be impossible.

Weeds within the row are destroyed. Cultivation can kill weeds between rows but herbicides control weeds within the row.

Narrow row production practices may be used. The present trend in agriculture is to plant row crops in spacings less than 40 inches wide to increase yields. As row spacings become narrower, cultivation becomes more difficult. Herbicides control weeds in this management practice.

Disadvantages of Preemergence Herbicides

Weed populations may not develop. This seldom happens but sometimes the farmer adopts a "wait and see" program. If weeds fail to develop he calculates the money saved. Most of the time, however, weeds do develop enough to reduce crop yields.

Rainfall is necessary to make herbicides work. Where rainfall does not occur for 1 or 2 weeks following herbicide application, weed control may be poor since the herbicide will not get into the soil and is not absorbed by the germinating weed seeds. On the other hand, too much rainfall may leach the herbicide too deep to kill weeds.

Soil Types Change Effectiveness of Preemergence Herbicides.

Farmers must know their soil type and adjust rates of

herbicides accordingly. Clay soils, or soils high in organic matter, generally require more herbicide than a sandy soil for the same weed control.

In western Nebraska preemergence herbicides must be used carefully to avoid injury to the crop since sandy soils do not "tie up" the herbicide. Crop injury can occur when you use too much herbicide.

Where Should You Use Preemergence Herbicides?

Preemergence herbicides are most useful in fighting weeds where you know fields are weedy. Grassy weeds in Nebraska are the main problem--killing them before they become established is essential in preventing crop yield losses.

Postemergence application of 2,4-D may be more economical if broadleaves are the major problem although time of application is critical.

Preemergence herbicides will not control established perennial weeds. These herbicides may be effective on new seedlings but cultivation is your best control for hard-to-kill perennials.

How and When to Apply Preemergence Herbicides?

Preemergence herbicides are usually applied either with an attachment on the seeder at planting time or shortly after planting with a separate operation but before weeds emerge. Some preemergence herbicides are applied before planting. These are called preplant herbicides, since they are applied before planting, but their weed-killing action is preemergence or before the crop or weeds emerge from the ground (Treflan is an example of a preplant herbicide).

Some chemicals are classed principally as preemergence herbicides but these may also be used postemergence or after the weeds come up (Atrazine is an example)

Atrazine can be used postemergence to kill weeds before they are 1 1/2" tall. You must apply the atrazine before weeds get too big.

Can Preemergence Herbicides be Applied Before Planting?

Most preemergence herbicides can also be applied shortly before planting. Thorough incorporation into the soil is possible while disking to prepare a seedbed. Some herbicides may lose weed control effectiveness, however, when incorporated. This method may be somewhat more risky in terms of crop injury, especially in sandy soils since you are seeding directly into the treated area.

A furrow opening planter attachment could be used to open a small furrow so that seed is placed in untreated soil.

Should You Use Spray or Granules?

Some manufacturers make herbicides to be applied either as a liquid (usually in water) or granule form. In most cases, both forms give good weed control. Granules require more water to activate them. In a dry year, granules do not give as good control as those herbicides which are applied in a spray. There are advantages to both kinds.

Advantages of Sprays

Less costly.

Applied more uniformly.

Spray calibration easier.

Wind movement along soil surface after application is less.

Less storage space required.

Advantages of Granules

Hauling water not required.

Spraying pumps, hoses and tanks not required.

More convenient to use.

May reduce product irritation.

May reduce herbicide drift during application.

Should You Use a Band or Broadcast Herbicide Application?

Choice of method will depend on the crop and the operator. Band applications reduce the cost of herbicides by about two-thirds and still give weed control in the row but you need to cultivate to destroy weeds between the rows.

Where perennial weeds are a problem and cultivation is necessary to obtain control, band application should be used. The farmer who uses band application assumes he will be able to get into the field and use timely cultivation.

Broadcast applications frequently require cultivation. A good band width for herbicides is 12 to 14 inches. Widths less than these lose the advantage for rapid cultivation.

Wider band widths increase herbicide costs. Use of narrow rows decreases the advantage of bands. Bands are most easily applied at planting time with herbicide attachments on the planter unit. Getting the bands centered over the row when applying the herbicide after planting can be a problem and often requires a 20" band. Special attention should be given to calibrating your sprayer or granular applicator for band application.

How Much Water Should You Use for Spraying?

Whether the herbicide is applied broadcast or in a band, the treated acre should receive at least 10 to 20 gallons of water to insure uniform coverage.

In the case of wettable powders there must be enough water to give a suitable suspension of particles for spraying. Using more than 20 gallons of water per acre increases the time spent hauling the extra water into the field and is of little benefit so far as herbicide activation is concerned.

Generally, one half inch of moisture is desirable. To supply this amount on one acre, you need to haul about 13,500 gallons of water.

Is Mechanical Incorporation Necessary?

In Nebraska, using a disk or other equipment is generally desirable with preemergence herbicides. Weed control may be greater and expense less.

Some herbicides (i.e., Treflan and Eptam) are applied before planting and must be incorporated with a disk or some other similar tillage implement to prevent loss from occurring.

Does Broadcasting Herbicides Eliminate Cultivation?

Once in a while, herbicides will stay in the soil long enough to provide season-long weed control. If the herbicide is working, there is little reason to rush cultivation. However, if, after applying the herbicide, there is no precipitation or if for some other reason the herbicide is not working, the rotary hoe or cultivator should be used soon enough to control the weeds.

In Nebraska, research shows preemergence herbicides plus two rotary hoeings, or herbicide plus two cultivations, gave 90% weed control in corn, sorghum and soybeans.

Cultivation is still one of the most important weed control tools available. Used in conjunction with preemergence herbicides, this combination provides the farmer a very effective weed control program.

Cultivation should still be a part of the weed control program because:

1. Cultivation provides the only opportunity to control perennial weeds.

2. No herbicide provides 100% control of all weed species.

3. Preemergence herbicides are not always effective.

Should Herbicides Be Mixed?

Because most herbicides control some weeds better than others it is possible to mix some of them together and get control of a greater number of different kinds of weeds in one application. Results to date look encouraging but more research needs to be done and these combinations must receive FDA clearance.

Mixing herbicides offers these possible advantages:

1. Lower rates of some persistent type herbicide.

2. Increased consistency of performance over a wide variety of weather and soil conditions.

3. Control of more weed species.

Some disadvantages are:

1. Combinations may not give as good weed control as chemicals used alone.

2. Combinations may increase crop injury.

3. Combinations may not mix.

Herbicides are too expensive and crops too valuable to mix materials "just to see what happens."

What About Mixing Herbicides with Other Crop Chemicals?

Insecticides: Most soil insecticides are applied in a narrow band (6 to 7") and herbicides are applied in a wide band (12 to 14"). The difference makes this mixture impractical.

Fertilizer: Fertilizer-herbicide combinations have laborsaving appeal by permitting the application of fertilizer and herbicide in one combination. To make the combination work the proper methods of application must be considered.

1. Surface applications of ammonium nitrogen liquids on saline and alkaline soils can cause high losses of nitrogen. Losses are cut by plowing down or disking this form of nitrogen into the soil with a combination fertilizer application and tillage operation. Herbicides, which give good weed control, applied preplant will fit here. Disking will better incorporate and distribute the herbicide than will plowing down.

2. Broadcast applications of liquid nitrogen fit post-emergence herbicides. One must wait until the crop is tall enough so spray nozzles can be directed at the base of the plant. Fertilizer sprayed directly on the crop will injure the crop while a herbicide such as atrazine causes no damage.

Cultivation or hilling for irrigation is advisable within a few days after application to place the fertilizer nitrogen nearer to crop roots.

Ask these questions about combinations of fertilizer and herbicides: Will the herbicide be applied correctly (distributed properly, incorporated if needed, in correct amount)? Will the nitrogen fertilizer be placed so the crop roots can use that which is applied? If the answer is yes to both, your chances of success are good.

What About Herbicide Residues?

An important consideration with preemergence herbicides is the soil residue problem. By residue we mean the carryover of herbicides in the soil in sufficient concentration to injure crops the following year. For farmers who practice crop rotations this is an important problem.

Herbicides remain in the soil for various lengths of time. Soil microorganisms, chemical breakdown, breakdown by light, soil absorption, volatilization, leaching and various plant reactions help break them down. An ideal herbicide would last long enough to give season-long weed control without carryover the following year.

Selecting the Preemergence Herbicide to Use

Every farmer should know the weed species on his farm--whether they are grass or broadleaf weeds or both.

Some preemergence herbicides control broadleaf weeds but do poorly on grasses--others are just the reverse.

Do not buy a preemergence herbicide with the idea that it will control all the weeds all the time. Failures do occur because of many things that influence their performance.

Satisfactory results, however, can be expected about 75% of the time. See Tables 1, 2, and 3 for herbicide performance on specific weeds.

Remember that preemergence herbicides will not control perennial weeds. Postemergence applications of 2,4-D are excellent for annual broadleaf weed problems in corn and sorghum.

If there is a choice of herbicides to use on the crop it is a good practice to rotate their use each year.

Table 1. Comparative weed control ratings of corn herbicides often used in Nebraska.[1] Weed control rating: E = Excellent; G = Good; F = Fair; P = Poor

	Corn herbicides												
	Preemergence[2]									Postemergence			
Weeds controlled	Atrazine	2,4-D ester	EPTC	Knoxweed-42	Lorox	Ramrod	Randox	Randox T	Simazine	Atrazine[3]	2,4-D	Dalapon	Dicamba
GRASS													
Barnyardgrass	G	F	G	G	G	G	G	G	G	F	P	G	P
Crabgrass	F	F	G	G	F	G	G	G	F	F	P	G	P
Fall panicum	F	F	G	G	F	G	G	G	F	F	P	G	P
Foxtail	G	F	G	G	G	G	G	G	G	F	P	G	P
Johnsongrass (from seed)	P	P	G	G	F	P	P	P	F	P	P	G	P
Wild cane	P	P	G	G	F	P	P	P	F	P	P	G	P
Yellow nutsedge	P	P	P	F	P	P	P	P	P	P	P	P	P
BROADLEAF													
Annual morningglory	G	G	G	G	P	P	P	G	G	E	E	P	G
Cocklebur	G	G	F	F	G	F	P	F	G	E	E	P	E
Jimsonweed	G	G	F	F	G	P	P	F	G	E	G	P	F
Lambsquarters	E	E	G	G	G	G	G	G	E	E	E	P	E
Pigweed	E	E	G	G	G	G	G	G	E	E	E	P	F
Ragweed (Annual)	E	E	G	G	G	F	F	G	G	E	E	P	E
Smartweed	E	G	F	G	G	P	P	G	G	E	G	P	G
Sunflower	G	F	G	G	P	P	G	G	E	E	F	P	F
Velvetleaf	G	F	G	G	G	P	P	G	G	E	E	P	E
CORN TOLERANCE	E	F	F	F	P	E	G	G	E	E	G	P	F

[1]Soil type and weather conditions will influence herbicide effectiveness. This chart is only a general performance guide.

[2]Preemergence herbicides may also be used preplant.

[3]Weeds less than 1 1/2 inches tall.

Table 2. Comparative weed control ratings of sorghum herbicides often used in Nebraska.[1] Weed control rating: E = Excellent; G = Good; F = Fair; P = Poor.

	Sorghum herbicides					
	Preemergence[2]				Postemergence	
Weeds controlled	Atrazine	Herban	Propazine	Randox	Atrazine[3]	2,4-D
GRASS						
Barnyardgrass	G	F	F	G	F	P
Crabgrass	F	F	F	G	F	P
Fall panicum	F	F	F	G	F	P
Foxtail	G	F	G	G	F	P
Johnsongrass (from seed)	P	P	P	P	P	P
Wild cane	P	P	P	P	P	P
Yellow nutsedge	P	P	P	P	P	P
BROADLEAF						
Annual morningglory	G	F	G	P	E	E
Cocklebur	G	F	F	P	E	E
Jimsonweed	G	F	F	P	E	G
Lambsquarters	E	G	E	G	E	E
Pigweed	E	F	E	G	E	E
Ragweed (Annual)	E	F	E	F	E	E
Smartweed	E	F	G	P	E	G
Sunflower	G	P	F	G	E	F
Velvetleaf	G	F	G	P	E	E
SORGHUM TOLERANCE	F	G	G	F	F	F

[1]Soil type and weather conditions will influence herbicide effectiveness. This chart is only a general performance guide.

[2]Preemergence herbicides may also be used preplant.

[3]Weeds less than 1 1/2 inches tall.

Table 3. Comparative weed control ratings of soybean herbicides often used in Nebraska.[1] Weed control rating: E = Excellent; G = Good; F = Fair; P = Poor.

	Soybean herbicides											
	Preplant	Preemergence[2]									Postemergence	
Weeds controlled	Treflan	Amiben	Alanap	Alanap + CIPC	Dacthal	Lorox	Planavin	Ramrod	Randox	Vernam	2,4-DB	Tenoran[3]
GRASS												
Barnyardgrass	E	F	F	F	G	G	E	G	G	G	P	F
Crabgrass	E	G	F	F	G	F	E	G	G	G	P	F
Fall panicum	E	G	F	F	G	F	E	G	G	G	P	F
Foxtail	E	G	F	G	G	G	E	G	G	G	P	F
Johnsongrass (from seed)	G	F	P	P	F	F	G	P	P	G	P	P
Wild cane	G	P	P	P	F	F	G	P	P	G	P	P
Yellow nutsedge	P	P	P	P	P	P	P	P	P	F	P	P
BROADLEAF												
Annual morningglory	F	P	P	F	P	P	F	P	P	F	P	G
Cocklebur	P	P	F	G	P	G	P	F	P	P	G	G
Jimsonweed	P	P	F	G	P	G	P	P	P	P	P	G
Lambsquarters	G	G	G	G	G	G	G	G	G	G	P	G
Pigweed	G	G	G	G	G	G	G	G	G	G	P	G
Ragweed (Annual)	P	G	G	G	F	G	P	F	F	F	P	G
Smartweed	P	G	P	G	F	G	P	P	P	P	P	G
Sunflower	P	P	F	F	P	P	P	P	G	P	P	G
Velvetleaf	P	F	F	F	P	G	P	P	P	P	P	G
SOYBEAN TOLERANCE	G	G	F	F	G	G	G	G	G	G	F	F

[1]Soil type and weather conditions will influence herbicide effectiveness. This chart is only a general performance guide.

[2]Preemergence herbicides may also be used preplant.

[3]Weeds less than 1 1/2 inches tall.