AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF MINNESOTA

AG-FO-0841--REVISED FOR 1986

Weed Control in Soybeans

RICHARD BEHRENS, Extension Agronomist

Weeds can be most effectively controlled in soybeans with a well- planned program that involves a thorough analysis of the field situation and use of a combination of cultural practices and appropriate herbicides. The most effective weed control system depends on the kinds of weeds in the field, soil characteristics, tillage practices, crop rotation, and soybean row width.

Weeds are vigorous competitors with soybeans. Weeds usually germinate and emerge with the soybeans, so the soybeans cannot get ahead of the weeds. Soybeans are relatively short and susceptible to shading from taller weeds. Weeds also compete with soybeans for nutrients and water. Since soybeans are especially sensitive to moisture deficiencies in late summer, a few large weeds can severely reduce yields. Nearly complete weed control must be accomplished within three to four weeks after emergence of the soybeans in order to avoid yield losses due to early emerging weeds.

There are opportunities for reducing the costs of weed control in soybeans. Knowing the specific weed species present and selecting the appropriate herbicide or herbicides that have a high level of effectiveness and the lowest per acre cost may allow substantial savings. Using band applications can cut the cash outlay for herbicides by one-half to two-thirds. Lower cost cultivation can provide between-the-row weed control in band application and may in some instances be used in place of high-cost herbicides. Reducing herbicide rates below label recommendations increases the possibility of costly failures in weed control. On the other hand, applying herbicides at rates higher than label recommendations to assure weed control success adds unnecessarily to herbicide costs and may result in crop injury. Applying herbicides at the proper time and rate with a carefully calibrated applicator provides the best return on your herbicide investment.

Cultural Practices

Several cultural practices aid weed control in soybeans. Seedbed preparation immediately prior to planting will kill weeds that have germinated. Killing these weeds is important in obtaining good results from preemergence herbicides. For effective weed control, herbicides applied preemergence need to be moved into the soil by rainfall before weed seeds germinate. If rainfall has not been sufficient for herbicide activation, control the weed seedlings with a rotary hoe, harrow, or cultivator as soon as they emerge.

Herbicides

A herbicide or herbicide combination should be selected on the basis of the weed species in the field (table 1), performance, soil texture, pH of the soil, amount of organic matter in the soil, soybean tolerance, crop rotation, tillage practices, and economics. Field conditions that affect a herbicide's performance or limit its usefulness must be considered. Dry soil, heavy rain after application, surface trash, or a poor seedbed may reduce weed control. Cultural practices and postemergence herbicide applications should be used when necessary to supplement soil applied herbicides.

Herbicide mixtures are used to overcome the limitations of single chemicals. Certain mixtures may (1) control more kinds of weeds, (2) give more consistent performance with different soils and weather conditions, (3) lessen soil residue problems, (4) increase persistence enough to give full season weed control, or (5) reduce crop injury. See table 2 for labeled tank-mixes of herbicides suggested for use in Minnesota. Only those mixtures that have been field tested under local conditions should be used. The use of some mixtures may result in poor weed control or crop injury.

The correct herbicide rate must be used to obtain good weed control and to minimize soybean injury. Herbicide rates must be adjusted for soil texture, percent organic matter, soil pH, kinds of weeds, potential for soil residue, and whether the herbicide is to be used alone or in combination. See table 2 for herbicide rate ranges. Always consult herbicide labels for specific rates. Only chemicals that are cleared by the Environmental Protection Agency for the specific use intended should be used.

No-Till or Minimum Till

In no-till or minimum till soybean production, herbicides may be required to control emerged weeds. Glyphosate (Roundup) or paraquat (Paraquat Plus or Gramoxone) are non-selective herbicides that will kill emerged weeds. These herbicides have no soil activity and are usually tank-mixed with other herbicides that provide residual control of later-germinating weeds (see table 2). **Paraquat is a restricted use herbicide.**

Preplant Incorporated Applications

Ethalfluralin (Sonalan), pendimethalin (Prowl), trifluralin (Treflan), or vernolate (Vernam or Reward) are suggested for preplant incorporated use in soybeans. Trifluralin also may be applied in the fall after September 1. These herbicides have provided good control of annual grasses and some broadleaf weeds (see table 1).

Proper herbicide application and favorable soil conditions are necessary for optimum herbicide performance. The soil should be moist, but not wet, to ensure maximum mixing of herbicide and soil during preplant herbicide incorporation. To provide good control, adequate moisture is needed at the point where the emerging weed seedling contacts the herbicide.

Good incorporation thoroughly mixes the herbicide with 2-3 inches of soil. Incorporate the herbicide twice with a disk, field cultivator with sweep shovels, or similar implement, or once with a power-driven rotary tiller. The second incorporation should be carried out at a right angle to the direction of the first incorporation. This is needed to ensure thorough mixing of the herbicide with the soil. Observe label instructions for proper equipment depth and operation speed. Under ideal soil conditions, adequate incorporation may be accomplished with one trip using multiple implements.

To prevent herbicide loss by evaporation, vernolate must be incorporated immediately after application and should not be applied to a wet soil surface. Consult specific labels to determine the maximum time period allowed between application and incorporation of other herbicides.

Ethalfluralin, pendimethalin, and trifluralin may persist more that one year in some soils under dry or cold conditions. Sensitive crops such as small grains, grain sorghum, or sugarbeets can be affected the following year. Some instances of corn injury from trifluralin carryover have been observed in Minnesota when recommended rates have been exceeded on lighter soil areas, in overlapping spray swaths or in sprayer turn-around areas. Plowing with a moldboard plow, compared to reduced tillage systems that do not include moldboard plowing, reduces the potential for crop injury from residues of these herbicides.

Table 1. Effectiveness of herbicides on major weeds in soybeans.

	Preplant incorporated								Preemergence						Postemergence								
	alachlor (Lasso)	**chloramben** (Amiben)	**metolachlor** (Dual)	**metribuzin** (Sencor or Lexone)	**pendimethalin** (Prowl)	**ethalfluralin** (Sonalan)	**trifluralin** (Treflan)	**vernolate** (Vernam, Reward)	**alachlor** (Lasso)	**chloramben** (Amiben)	**naptalam + dinoseb** (Dyanap)	**linuron** (Lorox)	**metolachlor** (Dual)	**metribuzin** (Sencor or Lexone)	**acifluorfen** (Blazer)	**bentazon** (Basagran)	**2,4-DB** (Butoxone or Butyrac 200)	**diclofop** (Hoelon)	**dinoseb** (Premerge)	**naptalam + 2,4-DB** (Rescue)	**naptalam + dinoseb** (Dyanap)	**fluazifop** (Fusilade)	**sethoxydim** (Poast)
Soybean tolerance	G	G	G	F	F/G	F/G	F/G	F	G	G	P	F	G	F	F	G	P	G	P	F/P	F/P	G	G
Grasses																							
Barnyardgrass	G	G	G	F	G	G	G	G	G	F/G	P	F	G	F	P	N	N	G	P	P	P	G	G
Woolly cupgrass	G	G	G	P	G	G	G	F/G	G	G	P	P	G	P	P	N	N	P	P	P	P	G	G
Giant foxtail	G	G	G	F	G	G	G	G	G	F/G	P	F	G	F	P	N	N	G	P	P	P	G	G
Green foxtail	G	G	G	F	G	G	G	G	G	F/G	P	F	G	F	P	N	N	G	P	P	P	G	G
Yellow foxtail	G	G	G	F	G	G	G	G	G	F/G	P	F	G	F	P	N	N	F	P	P	P	G	G
Wild proso millet	F	F	F	P	F	F	F	F	F	F	P	P	F	P	P	N	N	P	P	P	P	G	G
Nutsedge	G	P	G	P	N	N	N	G	F	P	P	P	F	P	P	G	N	P	P	P	P	N	N
Quackgrass	N	N	N	P	P	P	P	F	N	N	P	P	N	P	N	N	N	N	P	N	P	G	F
Sandbur	F	P	F	P	G	G	G	G	F	P	P	P	F	P	P	P	P	P	P	P	P	G	G
Broadleafs																							
Canada thistle	N	N	N	P	N	N	N	N	N	N	P	P	N	P	P	G	P	N	P	P	F/P	N	N
Cocklebur	P	P	N	F	N	N	N	P	N	P	F	P	N	F	F	G	F	N	F	F	F	N	N
Kochia	P	G	P	G	G	G	G	—	P	G	F	F	P	G	—	F	—	N	—	F	F	N	N
Lambsquarters	F/P	G	F/P	G	F/G	F/G	F/G	F	F/P	G	F	G	F/P	G	P	F	P	N	P	—	P	N	N
Venice mallow	P	G	P	G	P	P	P	G	P	G	—	G	P	G	F	G	P	N	—	—	F	N	N
Mustard	P	F	P	G	N	N	N	F	P	F	G	G	P	G	G	G	P	N	G	—	G	N	N
Eastern black nightshade	F	F	F	P	P	F	P	P	G	G	—	P	G	P	G	F	P	N	G	—	F/P	N	N
Hairy nightshade	F	F	F	P	P	P	P	P	G	G	—	—	F	P	F	F	—	N	—	—	—	N	N
Pigweed	G	G	G	G	G	G	G	G	G	G	F	G	G	G	G	P	P	N	P	—	P	N	N
Common ragweed	P	G	P	G	N	N	N	P	P	G	F	G	P	G	G	G	P	N	F	F	F	N	N
Giant ragweed	P	F	P	P	N	N	N	P	P	F	F	F	P	F	G	F	F	N	—	—	F	N	N
Smartweed	P	G	P	G	F	P	P	P	P	G	F	F	P	G	G	G	P	N	G	—	F	N	N
Wild sunflower	P	P	P	F	N	N	N	P	P	P	F	P	P	F	F/G	G	P	N	F	F	F	N	N
Velvetleaf	P	F	P	G	F	N	N	F	P	F	P	F	P	F	P	G	P	N	P	—	P	N	N

G = good; F = fair; P = poor; n = no control; — = insufficient information.

Table 2. Herbicide choices for soybeans.

Herbicide	Active ingredient, lb/A or (formulation/A)	Remarks
NO-TILL or MINIMUM TILL		
glyphosate		
(Roundup)	.75 to 3 (1 to 4 qts)	Kills emerged weeds. Has no soil activity so commonly combined with residual herbicides. Apply prior to soybean emergence to prevent soybean kill.
Mixtures listed on the label		
alachlor (Lasso or Bronco)	2.5 to 4	Adds preemergence control of annual grasses and a few broadleaf weeds.
alachlor + linuron (Lorox)	2.5 to 4 + .5 to 1.5	Adds preemergence control of annual grasses and broadleaf weeds.
alachlor + metribuzin	2.5 to 4 + .25 to .75	Adds preemergence control of annual grasses and broadleaf weeds.
Mixtures listed on other labels		
chloramben (Amiben)	2 to 3	Adds preemergence weed control. Use any labeled preemergence chloramben tank mix.
metolachlor + linuron	1.5 to 2.5 + .5 to 1.5	Adds preemergence weed control of annual grasses and broadleaf weeds.
metolachlor + metribuzin	1.5 to 2.5 + .25 to .5	Adds preemergence weed control of annual grasses and broadleaf weeds.
chloramben + metolachlor	2 to 3 + 1.5 to 2.5	Adds preemergence weed control of annual grasses and broadleaf weeds.
chloramben + alachlor	2 to 3 + 1.5 to 3	Adds preemergence weed control of annual grasses and broadleaf weeds.
paraquat	.25 to 1	Kills emerged weeds. Has no soil activity so commonly combined with residual herbicides. Apply prior to soybean emergence to prevent soybean kill. **A restricted use herbicide.**
(Paraquat Plus or Gramoxone)	(1 to 4 pts)	
Mixtures listed on the label		
linuron (Lorox)	.5 to 1.5	Adds preemergence weed control.
metribuzin (Sencor or Lexone)	.38 to 1	Adds preemergence control of broadleaf weeds.
alachlor (Lasso) + linuron	2 to 3 + .5 to 1.5	Adds preemergence weed control.
alachlor + metribuzin	2 to 3 + .25 to .5	Adds preemergence weed control.

Table 2 (continued). Herbicide choices for soybeans.

Herbicide	Active ingredient, lb/A or (formulation/A)	Remarks
Mixtures listed on other labels		
chloramben	2 to 3	Adds preemergence weed control. Use any labeled preemergence chloramben tank mix.
metolachlor (Dual) + linuron	1.5 to 2.5 + .5 to 1.5	Adds preemergence control of annual grasses and broadleaf weeds.
metolachlor + metribuzin	1.5 to 2.5 + .25 to .5	Adds preemergence control of annual grasses and broadleaf weeds.
chloramben + metolachlor	2 to 3 + 1.5 to 2.5	Adds preemergence control of annual grasses and broadleaf weeds.
chloramben + alachlor	2 to 3 + 1.5 to 3	Adds preemergence control of annual grasses and broadleaf weeds.
PREPLANT INCORPORATED		
ethalfluralin	.56 to 1.12	Controls annual grasses and some broadleaf weeds. Use preplant incorporated.
(Sonalan)	(1.5 to 3 pts)	At maximum rate gives partial control of eastern black nightshade.
Mixtures listed on the label		
alachlor (Lasso)	2 to 4	Adds control of nightshades, witchgrass and yellow nutsedge.
chloramben (Amiben)	2 to 3	Adds control of broadleaf weeds.
metolachlor (Dual)	1.5 to 3	Adds control of black nightshade and yellow nutsedge.
metribuzin (Lexone, Sencor)	.25 to .5	Adds control of broadleaf weeds.
pendimethalin	.5 to 1.5	Controls annual grasses and some broadleafs. Preplant incorporated.
(Prowl)	(1 to 3 pts)	
Mixtures listed on the label		
alachlor (Lasso)	2.5 to 4	Improves grass control and adds control of nightshades and yellow nutsedge.
chloramben (Amiben)	2	Adds control of smartweeds, velvetleaf and common ragweed.
metolachlor (Dual)	1.5 to 3	Improves control of grasses and adds control of nightshades and yellow nutsedge.
metribuzin (Lexone, Sencor)	.5 to .75	Controls additional broadleaf weeds.
chloramben + metribuzin	1.5 to 2 + .37 to .55	Controls additional broadleaf weeds.
trifluralin	.5 to 1	Controls annual grasses and some broadleafs. Use preplant incorporated in the fall
(Treflan 4E)	(1 to 2 pts)	or spring. Do not exceed recommended rates for the soil type or carryover may
(Treflan 10G)	(5 to 10 lbs)	injure sensitive crops the following year.
Mixtures listed on the label		
alachlor (Lasso)	2.5 to 4	Adds control of nightshades and yellow nutsedge. Preemergence overlay cleared.
chloramben (Amiben)	2 to 3	Controls additional broadleafs. Preemergence overlay cleared.
metolachlor	1.5 to 3	Adds control of nightshades and yellow nutsedge. Preemergence overlay cleared.
metribuzin	.25 to .5	Adds control of yellow nutsedge, velvetleaf and wild mustard.
chloramben + metribuzin	1.5 to 2.5 + .25 to .38	Controls additional broadleafs. Preemergence overlay cleared.
vernolate	2 to 3	Controls annual grasses, some broadleafs plus yellow nutsedge. Use preplant
(Vernam 7E)	(2.3 to 3.5 pts)	and incorporate immediately. Extender in Reward increases vernolate soil
(Vernam 10-G)	(20 to 30 lbs)	persistence. Reward or Vernam 10-G may be applied and incorporated after
(Reward)	(2.7 to 4 pts)	planting.
Mixtures listed on the label		
alachlor (Lasso)	1 to 2	Adds control of nightshades.
chloramben (Amiben)	1.5	Adds control of many broadleafs.
pendimethalin (Prowl)	.38 to .75	Adds control of velvetleaf, kochia and smartweeds.
trifluralin (Treflan)	.5 to 1	Adds control of kochia and improves annual grass control.
trifluralin + metribuzin	.5 + .25 to .38	Adds control of many broadleaf weeds and improves annual grass control.
PREPLANT or PREEMERGENCE		
alachlor	1.5 to 4	Controls annual grasses and some broadleafs including nightshade.
(Lasso)	(1.5 to 4 qts)	Cleared postemergence but less effective on emerged weeds.
(Lasso II)	(16 to 26 lbs)	
Mixtures listed on the label		
chloramben (Amiben)	2	Adds control of many broadleaf weeds.
dinoseb (Premerge)	3 to 4.5	Preemergence or before soybean leaves unfold. Use low rate for emerged broadleafs. If terminal bud is exposed soybean injury can be serious.
linuron (Lorox)	.5 to 1.5	Do not incorporate. Added broadleaf control.
metribuzin (Sencor or Lexone)	.25 to .5	Adds control of many broadleaf weeds.
chloramben + metribuzin	.75 to 3 + .25 to .5	Adds control of many broadleaf weeds.
linuron + metribuzin	.17 to 1 + .13 to .5	Adds control of most broadleaf weeds.
chloramben	1.8 to 3	Controls broadleafs and grasses, but more effective on broadleafs.
(Amiben)	(4 to 6 qts)	Cleared postemergence but less effective on emerged weeds.
(Amiben DS)	(2.4 to 3.6 lbs)	Weak on wild mustard.
(Amiben Granular)	(20 to 30 lbs)	
Mixtures listed on the label		
alachlor (Lasso)	1.5 to 3	Improves grass, nutsedge and nightshade control.
dinoseb (Premerge)	1.5 to 4.5	Preemergence or before first soybean leaves open. Use low rate for emerged broadleafs at cracking stage. If terminal bud is exposed soybean injury can be serious.
linuron (Lorox)	.33 to 1.5	Preemergence only. Improves grass and broadleaf control.
metolachlor (Dual)	1.5 to 2.5	Improves grass, nutsedge and nightshade control.

Table 2 (continued). Herbicide choices for soybeans.

Herbicide	Active ingredient, lb/A or (formulation/A)	Remarks
metribuzin (Sencor, Lexone)	.25 to .5	Improves broadleaf control, especially wild mustard.
pendimethalin (Prowl)	.75 to 1.25	Preplant incorporated. Improves grass control.
trifluralin (Treflan)	.5 to 1	Preplant incorporated only. Improves grass control.
vernolate (Vernam, Reward)	2.7 to 4	Preplant incorporated. Improves grass and velvetleaf control.
alachlor + metribuzin	1.5 to 3 + .25 to .5	Improves grass, nutsedge, nightshade and mustard control.
metolachlor + metribuzin	.75 to 1.5 + .25 to .5	Improves grass, nutsedge, nightshade and mustard control.
pendimethalin + metribuzin	.75 to 1.5 + .25 to .5	Preplant incorporated. Improves grass and mustard control.
trifluralin + metribuzin	.5 to 1 + .25 to .5	Preplant incorporated. Improves grass and mustard control.
diallate	1.5 to 2	Controls wild oats only. Apply preplant or preemergence incorporated.
(Avadex)	(1.5 to 2 qts)	*A restricted use herbicide.*
linuron	.5 to 2.5	Use in preemergence mixtures to improve broadleaf weed control. Ineffective if
(Lorox WP)	(1 to 5 lbs)	incorporated. If emerged, soybeans will be severely injured. Do not use on
(Lorox 4L)	(.5 to 2.5 qts)	sandy soils with less than 0.5% organic matter. Directed postemergence for small broadleafs.
Mixtures listed on the label		
alachlor (Lasso)	.5 to 3	Improves grass control and adds nutsedge and nightshade control.
chloramben (Amiben)	1.5 to 2.5	Improves overall grass and broadleaf control.
metolachlor (Dual)	1 to 2.5	Improves grass control and adds nutsedge and nightshade control.
pendimethalin (Prowl)	.5 to 1.3	Improves grass control. Apply pendimethalin preplant and linuron preemergence.
propachlor (Ramrod)	.65 to 3	Improves grass control. Seed crop only.
dinoseb (Premerge)	1.5 to 4.5	Directed spray to soybeans over 8 inches tall to control weeds up to 3 inches tall.
2,4-DB (Butyrac)	.2	Directed spray to soybeans over 8 inches tall to control 1- to 3-inch weeds.
metolachlor	2 to 3	Controls annual grasses and some broadleafs. Apply preplant incorporated or
(Dual)	(2 to 3 pts)	preemergence. Cleared early preplant for no-till and minimum till.
Mixtures listed on the label		
chloramben (Amiben)	1.8 to 2.7	Adds control of many broadleaf weeds.
dinoseb (Premerge)	1.5 to 4.5	Preemergence or before soybean leaves unfold. Use low rate for emerged broadleafs. If terminal bud is exposed soybean injury can be serious.
linuron (Lorox)	.5 to 1.5	Preemergence only. Adds control of broadleaf weeds.
metribuzin (Sencor, Lexone)	.25 to .5	Adds control of many broadleaf weeds.
dinoseb + naptalam (Dyanap)	1.1 to 1.5 + 2.3 to 3	Use preemergence or before soybean leaves unfold. If terminal bud is exposed soybean injury may occur.
metribuzin	.25 to .87	Controls many broadleaf weeds including wild mustard. Apply early preplant,
(Sencor or Lexone 4L)	(.5 to 1.7 pts)	preplant incorporated or preemergence. Use in mixtures with grass herbicides.
(Sencor or Lexone DF)	(.3 to 1.2 lbs)	Soybean tolerance only fair. In early preplant application, a second preemergence application can be used to extend weed control.
Mixtures listed on the label		
alachlor (Lasso)	2 to 3	Adds grass, nutsedge and nightshade control.
chloramben (Amiben)	1.5 to 2.5	Adds some grass and nightshade control.
ethalfluralin (Sonalan)	.56 to 1.12	Preplant incorporated only. Adds grass control.
metolachlor (Dual)	1.25 to 2.5	Adds grass, nutsedge and nightshade control.
pendimethalin (Prowl)	.75 to 1	Preplant incorporate to minimize soybean injury. Adds grass control.
trifluralin (Treflan)	.5 to 1	Preplant incorporated only. Adds grass control.
dinoseb + naptalam (Dyanap Premerge Plus)	1.1 to 1.5 + 2.3 to 3	Improves control of cocklebur. Preemergence or before soybean leaves unfold. If terminal bud is exposed soybean injury can be serious.
alachlor + dinoseb + naptalam	2 to 3 + 1.12 to 1.5 + 2.3 to 3	Adds control of grasses and cocklebur. Preemergence but before soybean leaves unfold. If terminal bud is exposed soybean injury can be serious.
alachlor + linuron	.75 to 2 + .17 to 1	Adds grass and some broadleaf control.
metolachlor + linuron	1.25 to 2.5 + .17 to 1	Adds grass and some broadleaf control.
POSTEMERGENCE		
acifluorfen	.37 to .75	Controls small broadleaf weeds. Apply postemergence. Apply again if necessary for
(Blazer)	(1.5 to 3 pts)	late emerging weeds. Burn of soybean leaves is common but recovery is usually complete. Surfactant is needed for maximum effectiveness.
Mixtures listed on the label		
bentazon (Basagran)	.5 to .75	Improves broadleaf control. Adding liquid fertilizer (10-34-0) improves velvetleaf control.
chloramben (Amiben)	2.5 to 3	Provides residual activity for later germinating weeds.
fluazifop (Fusilade)	.13 to .25	Adds grass and corn control. Some antagonism in tank mixes.
sethoxydim (Poast)	.23 to .38	Adds annual grass and corn control. Use 50% greater rates of sethoxydim in tank mixes.
bentazon + sethoxydim	.5 to .75 + .23 to .38	Adds annual grass and corn control. Use 50% greater rates of sethoxydim in tank mixes.
2,4-DB (Butyrac 200)	.03	Improves control of larger cocklebur, pigweed and ragweed.
barban	.38	Controls wild oats only. Apply when wild oats is in the 2-leaf stage.
(Carbyne 2EC)	(3 pts)	
bentazon	.75 to 1	Controls many annual broadleafs, nutsedge and Canada thistle. Apply when weeds
(Basagran)	(1.5 to 2 pts)	are small. Add oil concentrate under adverse conditions.

Table 2 (continued). Herbicide choices for soybeans.

Herbicide	Active ingredient, lb/A or (formulation/A)	Remarks
Mixtures listed on the label		
acifluorfen (Blazer)	.25 to .5	Improves control of nightshade, pigweeds and common ragweed. Soybean leaf burn occurs.
sethoxydim (Poast)	.3 to .4	Adds annual grass and corn control. Use 50% higher sethoxydim rate in tank mix.
acifluorfen + sethoxydim	.25 + .3	Improves control of broadleafs. Adds control of annual grasses and corn.
chloramben	3	Must add crop oil. Use after a soil-applied grass herbicide. Post emergence suppression
(Amiben)	(6 qts)	or control of pigweed, common ragweed and Pennsylvania smartweed plus residual
(Amiben DS)	(3.6 lbs)	preemergence activity.
diclofop	.75 to 1.25	Controls many annual grasses and volunteer corn. *A restricted use herbicide.*
(Hoelon)	(2 to 3.3 pts)	
dinoseb	.38 to 2.25	Apply high rates to soybeans in the cotyledonary stage. For emerged weeds only.
(Premerge)	(1 to 6 pts)	Apply lower rates from 1st trifoliate to bloom stage or soybeans for cocklebur. Soybean leaf burn likely.
Mixtures listed on the label		
naptalam (Dyanap or Premerge Plus)	.75 to 2	Soybeans from 1st trifoliate to bloom only. Expect soybean leaf burn and stunting. Only fair control of many broadleaf weeds. Variable weed control and soybean injury due to temperature. Split applications are possible.
fluazifop	.09 to .19	Controls annual grasses, corn and quackgrass. Quackgrass may require a second application. Always add a surfactant or crop oil concentrate.
(Fusilade 2000)	(.75 to 1.5 pts)	
Mixtures listed on the label		
acifluorfen (Blazer)	.38 to .75	Adds broadleaf weed control. Add a surfactant. Sequential or tank mix.
sethoxydim	.1 to .5	Controls grasses plus corn and suppresses quackgrass. Quackgrass may require a
(Poast)	(.5 to 2.5 pts)	second application. Add a crop oil concentrate.
Mixtures listed on the label		
bentazon (Basagran)	.75 to 1	Adds broadleaf weed control. Reduced grass control requires a 50% sethoxydim rate increase. Avoid antagonism by using sequential applications.
bentazon + acifluorfen	.75 to 1 + .25 to .5	Adds broadleaf weed control. Reduced grass control requires a 50% sethoxydim rate in-
(Blazer)		crease. Avoid antagonism by using sequential applications.
2,4-DB	.18 to .4	Mainly for common cocklebur. Apply as a directed spray to soybeans at least 8 inches tall
(Butyrac 200)	(.7 to 1.6 pts)	and cocklebur to 3 inches tall or other weeds 2 inches tall.
Mixtures listed on the label		
naptalam (Alanap or Rescue-pre mix)	1 to 1.5	Tank mix rate .03 to .045 lb/A of 2,4-DB. Apply broadcast to soybeans after first blooms appear to suppress cocklebur, giant ragweed, sunflower and wild mustard. Some soybean injury should be expected. A non-ionic surfactant or crop oil concentrate is required.

Preplant Incorporated or Preemergence Applications

Several herbicides including alachlor (Lasso), chloramben (Amiben), metolachlor (Dual), and metribuzin (Sencor or Lexone) are suggested for use either preplant incorporated or preemergence. These herbicides may be left on the soil surface or incorporated with one or two tillage operations. Preplant incorporated applications of these herbicides into moist soil are more effective when there is inadequate rainfall to activate preemergence applications. However, preemergence applications provide more effective weed control when adequate rainfall does occur. If weed seedlings begin to emerge following a preemergence application due to lack of rainfall, an early harrowing, rotary hoeing, or shallow cultivation will improve weed control.

NOTICE: Alachlor (Lasso) is now undergoing a Special Review by the U.S. Environmental Protection Agency (EPA) because tests show that tumors are caused when high levels of alachlor are fed daily to laboratory animals over long periods of time. In this Special Review, EPA is re-examining all health and safety tests and product benefits from alachlor usage. Recommendations from EPA on future uses of alachlor will be developed based on their estimate of these risks and benefits. As of November, 1985, it seems probable that alachlor will continue to be available during 1986 for use by Minnesota farmers.

Alachlor and metolachlor control annual grasses, nutsedge, redroot pigweed, and nightshade. Control of other broadleaf weeds has been erratic. Preplant incorporation of alachlor or metolachlor has resulted in more consistent yellow nutsedge control than preemergence applications.

Chloramben controls many annual broadleaf and grass weeds on a wide range of soils when sufficient rainfall occurs before weeds emerge. Excessive rainfall after application may move chloramben below the zone of weed germination and may reduce control. Soybean tolerance is good on a wide range of soils, including high pH soils. Infrequently, very heavy rainfall on coarse-textured (sandy) soils may move chloramben into contact with the germinating soybeans, resulting in stunted roots and delayed emergence.

Metribuzin has provided good control of several hard-to-control broadleaf weeds, but it has marginal crop safety. Crop safety can be improved by using lower labeled tank mix rates. See the label for restrictions on various soils and soybean varieties. Soybean injury is more likely on alkaline soils, sandy soils, where atrazine residues are present, or if used with vernolate.

Chlorpropham (Furloe Chloro IPC) applied preplant incorporated or preemergence has given good control of annual smartweed species. Soybeans have good tolerance to chlorpropham.

Pendimethalin (Prowl) applied preemergence to soybeans may cause callusing and brittleness of soybean stems under

Minnesota conditions. Such injury is unlikely when pendimethalin is applied preplant incorporated.

Preemergence applications of linuron (Lorox) controls annual broad-leaved weeds and some grasses in soybeans. Linuron is best suited for medium-textured soils with 4 percent organic matter or less. Weed control has been inconsistent on fine-textured soils with high organic matter content. Soybean injury may occur on sandy, low organic matter soils. Potential crop injury can be decreased by using reduced rates of linuron with another herbicide (see table 2).

NOTICE: Linuron (Lorox) in now undergoing a Special Review by the U.S. Environmental Protection Agency (EPA) because tests show that non- cancerous tumors are caused when high levels of linuron are fed daily to laboratory animals over long periods of time. In this Special Review, EPA is re-examining all health and safety tests and product benefits from linuron usage. Recommendations from EPA on future uses of linuron will be developed based on their estimates of these risks and benefits. As of November, 1985, it seems probable that linuron will continue to be available during 1986 for use by Minnesota farmers.

Dimethazone (Command) is a new herbicide which controls many grass and broadleaf weeds in soybeans when applied preplanting incorporated or preemergence. It is generally more toxic to grasses but is also highly toxic to velvetleaf. It gives effective control of common lambsquarters, Pennsylvania smartweed, common ragweed and suppresses common cocklebur. **Caution:** A request for registration has been submitted to the U.S. Environmental Protection Agency and clearance is expected prior to the 1986 growing season, but as of November, 1985, dimethazone has not been cleared for use on soybeans.

Postemergence

Acifluorfen (Blazer) and bentazon (Basagran) alone or mixed are suggested for postemergence broadleaf weed control in soybeans. The herbicide or mixture used should be determined by the weed species present (see table 1). The leaf stage and size of the weeds at the time of herbicide application are critical for consistent control with either herbicide. Applications made to weeds larger than the maximum labeled leaf stage may result in inconsistent or partial control with regrowth from surviving roots and stems.

Crinkling, bronzing or burning of young soybean leaves is a common response to acifluorfen treatments but soybeans typically recover and develop normally. Hot, humid weather, active growth at application, and the addition of surfactants or oil concentrates increase both herbicidal effectiveness and the possibility of soybean injury. Do not apply acifluorfen to weeds under stress because effectiveness may be reduced.

Bentazon may cause some leaf burn if applied to soybeans under stress; especially when an oil concentrate is added to improve weed control effectiveness. A split application may be necessary to control Canada thistle, yellow nutsedge, and annual broad-leaved weeds that continue to germinate throughout the growing season.

Chloramben applied early postemergence to soybeans will control a few species of broadleaf weeds; but, for the best weed control with this herbicide, germinated weeds should be controlled with an appropriate postemergence herbicide or removed by cultivation.

Diclofop (Hoelon) is suggested for postemergence annual grass and volunteer corn control in soybeans. Wild oat, giant foxtail, green foxtail, and barnyardgrass should be treated before they exceed the four-leaf stage. Yellow foxtail should be treated before it reaches the three-leaf stage for best results. The full label rate of diclofop should be used when the annual grass is at or near the maximum leaf stage for treatment. Volunteer corn should not be sprayed with diclofop until all of the corn plants have emerged. Do not tank mix diclofop with any other product or apply any other product within seven days of a diclofop application because diclofop may be deactivated by other pesticides. **Diclofop is a restricted use pesticide.**

Fluazifop (Fusilade) and sethoxydim (Poast) are postemergence chemicals for annual and perennial grass control in soybeans. Soybeans have good tolerance. Neither chemical controls broadleaf weeds. An oil concentrate is used with the spray to improve performance. Tank mixtures with bentazon and acifluorfen provide control of many broad leaf weeds also, but effectiveness of sethoxydim and fluazifop on grasses may be reduced. See the appropriate labels for further information on these tank mixes.

Dinoseb (Premerge) or a mixture of naptalam plus dinoseb (Dyanap) applied at the crook-stage of soybeans give fair control of some broadleafs (see table 1) with temporary soybean burn and stunting likely. Applications of dinoseb or dinoseb plus naptalam made after the first trifoliolate leaf stage of the soybeans vary in effectiveness depending on temperature and humidity and may result in inconsistent weed control or soybean leaf kill and stunting.

Barban (Carbyne) can be used as a postemergence treatment for wild oat control in soybeans. Application should be made when most of the wild oat plants are in the two-leaf stage. Do not apply later than 30 days after soybean emergence.

2,4-DB amine (Butoxone, Butyrac 200) is labeled for postemergence control of common cocklebur in soybeans. Weed control is less satisfactory and the potential for crop injury greater when 2,4-DB is used than when other postemergence broadleaf herbicides are used. A combination of 2,4-DB with naptalam (Rescue) can be applied to larger soybeans in bloom when competition from cocklebur, giant ragweed and sunflower is severe to reduce competition. Some soybean leaf injury and stunting should be expected.

Read the pesticide label and follow the instructions as a final authority on pesticide use.