EXTENSION FOLDER 641–1982

Weed Control in Corn

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Weed control in corn should be based on an optimum combination of cultural, mechanical, and chemical practices. The ideal combination for each field will depend on several factors including crop being grown, kinds of weeds, severity of the weed infestation, soil characteristics, tillage practices, cropping systems, and availability of time and labor.

Cultural Practices

Cultural practices for weed control in corn include seedbed preparation, establishing an optimum stand, adequate fertility, and timely cultivations. Weeds that germinate before planting can be destroyed with tillage operations or herbicides. Killing weeds just before planting gives the young crop seedlings a competitive advantage and often improves performance of preplanting or preemergence herbicides.

Early cultivations are most effective for killing weeds and for preventing crop yield reduction due to weed competition or corn root damage. The rotary hoe or harrow works best if used after weed seeds have germinated and are in the "white stage" or just emerging. A rotary hoe, harrow, or cultivator should be used as soon as weeds appear, even if preplanting or preemergence herbicides have been applied, unless a properly timed postemergence herbicide treatment is planned.

Set cultivators for shallow operation to avoid pruning the corn roots and to reduce the number of weed seeds brought to the surface. Throw enough soil into the row to cover small weeds, but avoid excessive ridging that may encourage erosion or interfere with harvesting. Shallow cultivation should be repeated as necessary to control newly germinated weeds.

Herbicides

When selecting an appropriate herbicide or combination of herbicide treatments, consider carefully the following factors:

- —Label approval for use
- —Use of the crop
- —Corn tolerance to the herbicide
- —Potential for chemical residues that may affect later crops
- —Kinds of weeds
- —Soil texture
- —Soil pH
- —Amount of organic matter in the soil
- —Climate

Table 1. Effectiveness of herbicides on weeds in corn[1]

	Preplanting						Preemergence							Postemergence							
	Alachlor (Lasso)	Metolachlor (Dual)	Butylate (Sutan+)	EPTC (Eradicane)	Cyanazine (Bladex)	Atrazine (AAtrex, others)	Alachlor (Lasso)	Atrazine (AAtrex, others)	Dicamba (Banvel)	Metolachlor (Dual)	Propachlor (Ramrod, Bexton)	Linuron (Lorox)	Cyanazine (Bladex)	2,4-D	Dicamba (Banvel)	Atrazine and oil	Cyanazine (Bladex)	Bentazon (Basagran)	Bentazon + atrazine (Laddok)	Pendimethalin (Prowl) + atrazine	Pendimethalin (Prowl) + cyanazine (Bladex 80W)
Corn tolerance—	G	G	G	G	F	G	G	G	F	G	G	F	F	F	G	G	F	G	G	F/G	F
Grasses—																					
Giant & robust foxtail	G	G	G	G	F	F	G	F	P	G	G	F	F	N	N	F	F	N	F	G	G
Green foxtail	G	G	G	G	G	G	G	G	P	G	G	F	G	N	N	G	G	N	F	G	G
Yellow foxtail	G	G	G	G	G	G	G	G	P	G	G	F	G	N	N	G	G	N	F	G	G
Barnyardgrass	G	G	G	G	F	F	G	F	P	G	F	F	F	N	N	F	F	N	F	G	G
Crabgrass	G	G	G	G	F	P	G	P	P	G	G	G	F	N	N	P	F	N	P	F/G	G
Panicum	G	G	G	G	F	P	G	P	P	G	F	G	F	N	N	P	F	N	P	F/G	G
Nutsedge	G	G	G	G	P	P	F	P	N	F	F	P	P	N	N	F	P	G	G	P	P
Quackgrass	N	N	N	F	P	G	N	G	N	N	N	N	P	N	N	G	P	N	P	P	P
Woolly cupgrass	G	G	F	G	P	P	G	P	P	G	F	P	P	N	N	F	F	N	P	F	F/G
Wild proso millet	F	F	F	F/G	P/F	P	F	P	P	F	F	P	P/F	N	N	P	P/F	N	P	F	F/G
Wild oat	P	P	F	F	F	G	P	G	N	P	P	G	F	N	N	G	F	N	G	G	G
Broadleafs—																					
Buffalo bur	P	P	F	G	P	P	P	P	P	P	P	P	P	P	P	G	F	P	G	G	F
Cocklebur	N	N	P	P	F	F	N	F	F	N	P	P	F	G	G	G	F	G	G	G	F
Kochia	P	P	P	F	G	G	P	G	F	P	P	F	G	F	G	G	G	—	G	G	G
Lambsquarters	F	P	P	F/G	G	G	F	G	G	P	P	G	G	G	G	G	G	F	G	G	G
Mustard	P	P	P	P	G	G	P	G	G	P	P	G	G	G	F	G	G	G	G	G	G
Pigweed	G	G	F	F	F	G	G	G	G	G	F	G	F	G	G	G	F	P	G	G	F
Ragweed	P	P	P	F	G	G	P	G	G	P	P	G	G	G	G	G	G	G	G	G	G
Smartweed	P	P	P	P	G	G	P	G	G	P	P	F	G	P	G	G	G	G	G	G	G
Velvetleaf	P	P	F	F	F	F	P	F	F	P	P	F	F	G	G	F	F	G	G	G	G
Wild sunflower	P	P	P	P	F	F	P	F	F	P	P	P	F	F	G	G	F	G	G	G	G
Canada thistle	N	N	N	N	P	P	N	P	N	N	N	N	P	F	G	F	P	F	F	P	P
Jerusalem artichoke	N	N	N	N	P	P	N	P	P	N	N	P	P	G	G	P	P	P	P	P	P
American germander	N	N	P	F	P	P	N	P	P	N	N	P	P	P	P	G	F	P	F	F	F

[1]G = Good, F = Fair, P = Poor, N = None

—Weather
—Formulation of the chemical
—Application equipment available
—Potential for drift problems

There are a number of herbicides available for use in corn. In setting up a weed control program for several years, it may be advisable to rotate a selection of herbicides from different chemical families, particularly in continuous corn.

Chemical rotations reduce the likelihood of a buildup of resistant weeds or of herbicide residues in the soil. Even if corn is being rotated to other crops, a chemical rotation can be planned for several years in the cropping system. The commonly used herbicides for corn in different chemical families are:

Acetamides—alachlor, metolachlor, propachlor
Benzoic acids—dicamba
Dinitroaniline—pendimethalin
Other—bentazon
Phenoxys—2,4-D
Substituted ureas—linuron
Thiocarbamates—butylate, EPTC
Triazines—ametryne, atrazine, cyanazine, simazine

This folder summarizes herbicide suggestions for corn, based on numerous experiment station and U.S. Department of Agriculture tests to determine their overall effectiveness. Herbicide labels should be followed.

Table 1 indicates corn tolerance to herbicides suggested for use in corn and relative effectiveness and reliability of these herbicides in controlling common weeds. This table shows general comparative control ratings based on field observations. Under unfavorable conditions, any of the herbicides may give unsatisfactory results. Under favorable conditions control may be better than indicated.

Preplanting Applications

Some herbicides may be applied to the soil before planting and incorporated 2 to 3 inches into the soil with a disk, field cultivator, or similar implement. The disk or field cultivator should be set to operate twice as deeply as the desired depth of incorporation. Use sweep shovels on the field cultivator to get more uniform mixing of the chemical and soil.

The field should be disked or cultivated twice, once in each direction, after applying the chemical. If the soil is not too moist or rough and is in a good tilth condition, adequate incorporation may be achieved with one pass over the field with some combination implements. To avoid excessive loss of volatile chemicals like EPTC or butylate, the first tillage operation should follow immediately behind the sprayer.

Butylate (Sutan+) or EPTC (Eradicane) applied preplanting and incorporated at 3 to 6 pounds per acre has given good control of annual grasses and fair control of a few annual broadleafs, but these chemicals do not control several annual broadleafs or most perennial weeds. Both chemicals are effective against nutsedge. EPTC may be used to control quackgrass, but trial results have been inconsistent. Butylate and EPTC are formulated with an antidote chemical to prevent corn injury. A new formulation of EPTC also has an added chemical that extends the effectiveness of EPTC. This new formulation has improved performance of EPTC on some fields where the chemical has been used previously and on wild proso millet.

Preplanting and disked-in applications of atrazine have resulted in weed control equal to or, under dry conditions, better than preemergence applications without incorporation. Broadcast applications, necessary when preplanting treatments are used, may increase the potential of atrazine carryover, compared to banded preemergence applications.

Mixtures of butylate or EPTC (Eradicane) and atrazine or cyanazine (Bladex) applied preplanting and incorporated have controlled both annual grasses and broadleafs. These mixtures improve broadleaf control compared to butylate or EPTC alone. Cyanazine does not carry over to the following year, and the lower rate of atrazine used in the mixtures reduces carryover problems from atrazine compared to those caused by the higher rates used when atrazine is applied alone. Cyanazine with butylate is not recommended for use on coarse- to medium-textured soils with less than 2 percent organic matter because of potential corn injury.

Preplanting, incorporated applications of alachlor (Lasso) at 3 to 4 pounds per acre or metolachlor (Dual) at 2 to 3 pounds per acre have controlled nutsedge effectively. Under dry conditions, control of annual weeds usually has been improved over preemergence applications by shallow preplanting incorporation of alachlor or metolachlor. Atrazine or cyanazine may be tank mixed with alachlor or metolachlor to improve broadleaf control.

Preemergence Applications

Atrazine at 1 to 3 pounds per acre has given good control of annual weeds with no injury to corn. A 3-pound-per-acre rate of atrazine should be used on fine-textured soils or those high in organic matter. One to 2 pounds per acre of atrazine is adequate on sandy soils that are low in organic matter.

Atrazine sometimes affects small grains, flax, sugarbeets, sunflowers, soybeans, other legumes, vegetables, and other sensitive crops planted the following spring. The label recommends that small grains, flax, sugarbeets, vegetables, and small-seeded legumes or grasses not be planted in the year following atrazine application.

Soybeans may be injured the year following atrazine use if the rate of atrazine application was more than 2 pounds per acre of active ingredient in western Minnesota or 3 pounds in eastern Minnesota, or if application was made after June 10. However, in some years, soybean injury has occurred following use within these restrictions, especially on highly alkaline soils of western Minnesota.

Residue can be minimized by using the lowest rate of chemical consistent with good weed control, using band rather than broadcast applications, and plowing or thoroughly tilling the soil before planting soybeans. Atrazine residues are more likely to persist if soil moisture or temperatures are low.

Cyanazine (Bladex), chemically similar to atrazine, has given good control of annual grasses and most broadleafs when applied preemergence. There has been no soil residue the following season except from granules following dry years. Weed control is not as good under dry conditions as under moderate to heavy rainfall. Within the suggested rates of 1.2 to 4 pounds per acre, the higher rates are required on soils higher in organic matter and finer-textured soils. Corn injury may occur on sandy soils. Granular formulations of cyanazine have been less effective than sprays under limited rain conditions.

Propachlor (Ramrod, Bexton) has given good annual grass control when applied preemergence at 4 to 6 pounds per acre. Propachlor does not consistently control most broad-leaved or perennial weeds, but it may be used in mixtures with atrazine

or linuron for annual grass and broadleaf control. Corn is very tolerant to propachlor.

Alachlor (Lasso), chemically related to propachlor, controls annual grasses in corn. In addition, alachlor has given fair to good control of redroot pigweed and common lambsquarters, but control of other broadleafs has been erratic. Corn has good tolerance to alachlor. Suggested rates are 2½ to 4 pounds per acre in the liquid formulation and 2.4 to 3.9 pounds per acre in the granular formulation (Lasso II).

Metolachlor (Dual), chemically related to alachlor and propachlor, controls annual grasses and redroot pigweed. Corn has good tolerance to the chemical. Preemergence applications have controlled nutsedge on coarser soils that are low in organic matter, but on finer-textured, dark soils, preplanting applications have controlled nutsedge better than preemergence treatments.

Metolachlor is labeled for preemergence application at 1.5 to 3 pounds per acre. Corn, soybeans, sorghum, root crops, or small grains may be grown the year after using metolachlor. Other crops should not be planted for 18 months after application of metolachlor.

Pendimethalin (Prowl) may be used alone at 1 to 2 pounds per acre or in mixtures at 1 to 1½ pounds per acre for preemergence control of most annual grassy weeds and some broadleafs such as common lambsquarters, pigweed, smartweed, and velvetleaf in corn. In Minnesota trials, preemergence applications of this compound have been somewhat less effective on grasses but more effective on broadleafs than alachlor. Tank mixes with atrazine, cyanazine, or dicamba provide a broader spectrum of weed control.

Corn root injury and lodging have sometimes occurred from preemergence applications of pendimethalin. It does not give adequate weed control on peat or muck soils. Corn injury may occur on sandy soils. With dicamba, do not use it on sandy soils or on loams, silts, and silt loams with less than 3 percent organic matter. Incorporating pendimethalin or ridging soil along the row when cultivating may increase corn injury.

Preemergence Herbicide Mixtures

Mixtures of atrazine with alachlor, linuron, metolachlor, pendimethalin, or propachlor are registered for preemergence application on corn to control annual grasses and broadleafs. Soil residues of atrazine are reduced by using these mixtures since application rates are lower than if atrazine is used alone. These mixtures are less effective than atrazine alone on quackgrass. Do not apply the mixture with linuron after corn is up, or severe corn injury may occur.

A 1:1 ratio of active ingredients of an atrazine-linuron mixture has given weed control comparable to an equivalent rate of atrazine alone on soils low in organic matter. Using linuron in combination with atrazine reduces the likelihood of corn injury and usually improves weed control, compared to using linuron alone. Rates vary from ½ to 1½ pounds per acre of each chemical according to soil type. Corn tolerance to this mixture is not as great as to atrazine alone. Corn injury may occur on coarse-textured soils that have low organic matter content.

The mixtures of atrazine or cyanazine with alachlor, metolachlor, or propachlor control broad-leaved weeds better than alachlor, metolachlor, or propachlor alone and give more consistent control on high organic matter soils or with limited

(Text continued on page 5)

Table 2. Suggestions for chemical control of weeds in corn

Method of application Chemical-common name (Trade name[1])	Rate—lb/A of active ingredient or acid equivalent broadcast[2]	EPA registration limitations on crop use	Remarks[3]
Preplanting incorporated			
Alachlor (Lasso)	2 to 4	None	Preplanting application of alachlor or metolachlor at the high rates is suggested if nutsedge is a problem, but for annual grasses only, shallow incorporation or preemergence application is preferred. Incorporate butylate or EPTC immediately after application. Do not use butylate or EPTC on corn seed stock.
(Lasso II)	2.4 to 3.9		
Atrazine (AAtrex, others)	2 to 3	Do not graze or feed forage for 21 days after treatment.	
Butylate (Sutan+)	4 to 6	None	
Cyanazine (Bladex)	2 to 4	None	
EPTC + protectant (Eradicane)	3 to 6	None	
Metolachlor (Dual)	1½ to 3	None	
Atrazine + alachlor	1 to 2 + 1½ to 2½	Do not graze or feed forage for 21 days after treatment.	
Atrazine + butylate	1 to 1½ + 3 to 4	Do not graze or feed forage for 21 days after treatment.	
Atrazine + EPTC (Eradicane)	1 to 1½ + 3 to 4	Do not graze or feed forage for 21 days after treatment.	
Atrazine + metolachlor (Bicep or tank mix)	1 to 3 + 1¼ to 3	Do not graze or feed forage for 21 days after treatment.	
Cyanazine + alachlor	1 to 2.2 + 2 to 2½	None	
Cyanazine (Bladex) + butylate	1½ to 2 + 3 to 4	None	
Cyanazine + EPTC (Eradicane)	1½ to 2 + 3 to 4	None	
Cyanazine + metolachlor	0.8 to 2½ + 1¼ to 2½	None	
Preemergence			
Alachlor (Lasso)	2 to 3½	None	Atrazine may carry over and affect crops the next year. Other chemicals do not carry over. Do not use preemergence applications of cyanazine, propachlor, dicamba, or linuron on sandy soils. Linuron is suggested for use only on soils between 1 and 4 percent in organic matter. Use dicamba only on medium- and fine-textured soils with more than 2.5% organic matter.
(Lasso II)	2.4 to 3.9		
Atrazine (AAtrex, others)	1 to 3	Do not graze or feed forage for 21 days after treatment.	
Cyanazine (Bladex)	2 to 4	None	
Metolachlor (Dual)	1½ to 3	None	
Propachlor (Ramrod, Bexton)	4 to 6	None	
Atrazine + alachlor	1 to 2 + 1½ to 2½	Do not graze or feed forage for 21 days after treatment.	
Atrazine + metolachlor	1 to 2 + 1¼ to 2	Do not graze or feed forage for 21 days after treatment.	
Atrazine + propachlor	1 to 1½ + 2 to 3-3/4	Do not graze or feed forage for 21 days after treatment.	
Cyanazine + alachlor	1 to 2.2 + 2 to 2½	None	
Cyanazine + metolachlor	0.8 to 2½ + 1¼ to 2½	None	
Cyanazine + propachlor	1 to 1.8 + 2½ to 6	None	
Dicamba (Banvel) + alachlor	½ + 2 to 2½	Do not graze or feed silage prior to milk stage.	
Dicamba + metolachlor	½ + 2 to 2½	Do not graze or feed silage prior to milk stage.	
Linuron (Lorox) + alachlor	½ to 1½ + 1 to 3	Do not graze or harvest immature corn for feed within 12 weeks after treatment.	
Linuron + propachlor	1 to 1½ + 2 to 3	None	
Postemergence			
Atrazine (AAtrex, others) + oil	1.2 to 2	Do not graze or feed for forage for 21 days after treatment.	Apply atrazine when weeds are less than 1½ inches tall.
Bentazon (Basagran)	3/4 to 1	None	Apply bentazon when weeds are 2 to 6 inches. Earlier application is more effective on most weeds.
Bentazon + atrazine (Laddok) + oil concentrate	½ to 3/4 + ½ to 3/4 + 1 qt/A	Do not graze or feed for forage 21 days after application.	Controls only broadleafs. Apply when weeds are less than 2 to 4 inches and corn has 1 to 5 leaves.
Cyanazine (Bladex 80W)	2	None	Apply cyanazine when weeds are less than 1½ inches tall and before corn has more than 4 leaves. Use vegetable oil or surfactant under acid conditions only. See label.
Pendimethalin (Prowl) + atrazine	3/4 to 1½ + 1 to 1½	None	Apply spike to 2-leaf stage of corn and up to 1-inch weeds.
Pendimethalin + cyanazine 80W	3/4 to 1½ + 1 to 2	None	
Dicamba (Banvel)	¼	Do not graze or harvest for feed before milk stage.	Apply dicamba before corn is 2 feet tall and not within 15 days of tasseling. Follow drift control precautions on label.
Dicamba + 2,4-D amine	1/8 + ¼	Do not graze or harvest for feed before milk stage.	
2,4-D amine	¼ to ½	Do not forage or feed fodder for 7 days following 2,4-D application.	Apply 2,4-D at these rates when corn is 4 inches to 3 feet tall. Use drop nozzles after corn is 8 inches tall. Earlier applications on small weeds are more effective.
2,4-D ester	1/6 to 1/3	Do not forage or feed fodder for 7 days following 2,4-D application.	
2,4-D amine	½ to 1	Do not forage or feed fodder for 7 days following 2,4-D application.	Apply 2,4-D at these rates only after corn is 3 feet tall. Use drop nozzles so only base of stalk is sprayed. Do not apply between tasseling and dough stage of corn.
2,4-D ester	1/3 to 2/3	Do not forage or feed fodder for 7 days following 2,4-D application.	

[1] See table on herbicide names. Trade names are used to identify the herbicide discussed. Omission of other trade names of similar herbicides is unintentional. The inclusion of a trade name does not imply endorsement and exclusion does not imply nonapproval.

[2] These rates will need to be properly interpreted for the formulation you use and for band width and row width if the chemicals are not applied braodcast. See Agricultural Chemcials Fact Sheet No. 5, *How to Calculate Herbicide Rates and Calibrate Herbicide Applicators.* The proper rate depends on such things as soil characteristics, kinds of weeds, size of weeds and crop, temperature, and moisture conditions.

[3] Read labels for detailed use instructions and restrictions on crop use.

rain than atrazine or cyanazine alone. Corn has good tolerance to these mixtures.

Using mixtures of linuron and propachlor or alachlor reduces the potential for corn injury compared to using linuron alone since lower rates of linuron are used. These mixtures control broadleafs better than propachlor or alachlor alone. Suggested rates are 1 to 1½ pounds per acre of linuron, with 3 pounds per acre of propachlor or 1 to 3 pounds per acre of alachlor. Do not use these mixtures on sandy soils because of possible crop injury from linuron.

A preemergence mixture of alachlor or metolachlor with dicamba (Banvel) improves broadleaf control compared to alachlor or metolachlor alone and improves grass control and reduces corn injury compared to dicamba alone. Dicamba should be applied preemergence only on medium- or fine-textured soils with more than 2.5 percent organic matter. Do not incorporate this mixture prior to corn emergence. Harrowing or dragging before corn emerges may increase corn injury.

Early Postemergence Sprays

Such sprays of atrazine effectively control most annual weeds in corn. Broad-leaved weed control is especially good. Grass control is less consistent. It is important to apply early postemergence treatments at the proper time or results may be poor. Apply atrazine while the weeds are less than 1½ inches tall. Application may be made until corn is 30 inches tall. Drop nozzles should be used to keep the spray out of the tops of the corn and to give better spray coverage on the weeds.

Adding 1 gallon per acre of special oils with an emulsifier or ¼ to ½ gallon per acre of special adjuvant-oil emulsions to the spray increases the effectiveness of early postemergence applications of atrazine. Labeled emulsions of either vegetable or petroleum oils are satisfactory.

Various formulations of surfactants and detergents used with atrazine have not improved weed control as much as using oils. Suggested atrazine rates for postemergence application with oil are 1.2 pounds per acre for broadleafs and 2 pounds per acre for annual grasses.

When atrazine is used, early postemergence treatments are preferred to preemergence if the soil is high in clay or organic matter and in western Minnesota, where rainfall is less certain. These are the areas where preemergence applications of atrazine have given less satisfactory weed control.

Severe corn injury has resulted from adding 2,4-D to this mixture. Corn injury has occurred also when atrazine and oil were applied to corn growing under cold, wet conditions, or if frost occurred shortly before or after application.

Cyanazine (Bladex 80W) is effective on annual grasses and broadleafs as an early postemergence herbicide. It is cleared for use through the 4-leaf stage of corn and before weeds are more than 1½ inches tall. Pigweed and lambsquarters have shown some tolerance. Oils or surfactants added to the spray increase the potential for corn injury and have resulted in severe corn injury and stand reduction under conditions of heavy rains or dews, cool temperatures, and cloudiness.

Under dry conditions, vegetable oils or certain surfactants may be used to improve weed control. Use only the wettable powder formulation for postemergence application. Do not use on sands with less than 1 percent organic matter.

Bentazon (Basagran) may be applied alone or in a mixture with atrazine as a postemergence treatment in corn to control certain annual broad-leaved weeds, Canada thistle, and nutsedge. Corn has good tolerance to bentazon, but do not apply it when corn is stressed from adverse growing conditions. Apply when annual weeds are less than 2 inches tall, but some species may be controlled up to 10 inches tall. Rain within 24 hours after application will reduce the effectiveness of bentazon. Do not mix bentazon with fertilizers. A non-phytotoxic oil concentrate or crop oil may be mixed with bentazon or with a combination of bentazon and atrazine for applications in corn to improve weed control.

Alachlor (Lasso) may be applied postemergence in a mixture with dicamba (Banvel) to corn less than 3 inches tall. Alachlor or metolachlor (Dual) may be applied with atrazine on corn that is no more than 5 inches tall to control weeds in the two-leaf stage or smaller. Weed control may be less consistent than that from preemergence applications. Propachlor (Bexton, Ramrod) alone or mixed with atrazine may be applied after corn has emerged to control grasses up to the two-leaf stage.

Pendimethalin (Prowl) in mixtures with atrazine or cyanazine wettable powder may be applied after corn emergence, but no later than when corn is in the two-leaf stage and when weeds are no more than 1 inch tall. These mixtures have been effective against annual grasses and broadleafs. The early postemergence application of pendimethalin and cyanazine used following a preplanting application of EPTC has improved the control of wild proso millet.

Table 3. Herbicide names and formulations

Common name	Trade name	Concentration and commercial formulation[1]
Alachlor	Lasso Lasso II	4 lb/gal L 15% G
Alachlor + atrazine	Lasso/atrazine	9 + 6% G, 2½ + 1½ lb/gal F
Atrazine	AAtrex, others	80% WP, 4 lb/gal F 90% WDG
Atrazine + metolachlor	Bicep	2 + 2½ lb/gal F
Bentazon	Basagran	4 lb/gal L
Bentazon + atrazine	Laddok	1.66 + 1.66 lb/gal F
Butylate and protectant	Sutan+	6.7 lb/gal L, 10% G
Butylate + atrazine	Sudan +/ atrazine	18% + 6% G
Cyanazine	Bladex	80% WP, 15% G, 4 lb/gal F
Dicamba	Banvel	4 lb/gal L
Dicamba and 2,4-D	Banvel-K	1.25 lb/gal dicamba + 2.50 lb/gal 2,4-D L
EPTC and protectant	Eradicane	6.7 lb/gal L
Linuron	Lorox	50% WP, 4 lb/gal F
Metolachlor	Dual	8 lb/gal L
Pendimethalin	Prowl	4 lb/gal L
Propachlor	Bexton, Ramrod	65% WP, 20% G, 4 lb/gal L
Propachlor + atrazine	Ramrod and atrazine	48.1 + 20.9% WP
2,4-D	several	various

[1] G = Granular, L = Liquid, WP = Wettable Powder, WDG = Water Dispersible Granule, F = Flowable.

Postemergence Applications

Annual broad-leaved weeds can be controlled with broadcast postemergence applications of ¼ to ½ pound per acre of 2,4-D amine when the corn is 4 to 8 inches tall. More severe onion leafing may occur from 2,4-D applications made in the 2- to 3-leaf stage of the corn.

The ¼-pound rate has been adequate for susceptible weeds and is less dangerous to corn. The ½-pound rate has been satisfactory for moderately resistant weeds, but corn usually has been injured by this rate. Rainfall within 8 hours after application reduces the effectiveness of 2,4-D amines more than the effectiveness of 2,4-D esters. About 1/3 less acid equivalent of 2,4-D esters is needed than of the 2,4-D amines.

Spray drift from either amines or esters of 2,4-D will injure susceptible plants. Since the ester forms are volatile, vapor injury to nearby susceptible crops is a possibility. Low volatile esters should be used rather than high volatile esters. Using amines eliminates the danger of vapor injury because amines are not very volatile.

To reduce the danger of 2,4-D injury when the corn is more than 8 inches tall, avoid spraying the upper leaves and leaf whorl of corn by using drop nozzles between the rows. However, adequate spray coverage of the tops of the weeds is necessary for maximum weed control. If nozzles are directed toward the row from both sides, the herbicide concentration must be reduced to compensate for the double coverage. Do no use spray additives with 2,4-D as corn injury may be increased.

Some injury may result when corn is sprayed with 2,4-D. Brittleness, followed by bending or breaking of stalks, is the most serious type of injury, and it may result in severe stand losses when applications of 2,4-D are followed by a storm or careless cultivation.

Several factors influence the degree of injury resulting from 2,4-D. Hybrids vary in tolerance to 2,4-D. Corn growing rapidly is more susceptible than corn developing under less favorable growth conditions. When temperatures exceed 85°F. just before or at the time of 2,4-D application, the corn is more likely to be injured.

At the rates of application commonly used, the stage of growth at which treatment is made during the period from emergence to tasseling is less critical than the effects of environmental factors.

If broad-leaved weed control is necessary after the last cultivation, 2,4-D ester at ½ pound per acre or 2,4-D amine at 3/4 to 1 pound per acre may be applied using drop nozzles. Do not apply 2,4-D from tasseling to dough stage, or poor kernel set may occur. 2,4-D can be applied at ½ to 1 pound per acre after the dough stage if necessary, but it is more beneficial to control weeds earlier.

Dicamba (Banvel) as a postemergence spray in corn has given better control of Canada thistle and smartweed than 2,4-D with less effect on the corn. Dicamba also controls other broad-leaved weeds except mustard, but it does not control grasses. But when used, dicamba drift has often affected soybeans in the vicinity of treated cornfields.

Dicamba can be used in corn at ¼ pound per acre, either alone or in mixtures with 2,4-D amine at ¼ to ½ pound per acre. Applications can be made until corn is 2 feet tall or until 15 days before tassel emergence, whichever occurs first. Do not use on corn grown for seed. Later applications, especially when corn is tasseling, may result in poor kernel set. Use drops after corn is 8 inches tall. Do not use additives with dicamba.

A mixture of dicamba and atrazine is cleared for use on corn as an early postemergence treatment. The mixture has given good broadleaf control, but grass control has been erratic. Oils and other additives should not be used with the mixture.

Caution: Soybeans and other broad-leaved plants are very sensitive to dicamba. In recent years, there were many instances in which dicamba drift affected soybeans. Users of dicamba must take special precautions to avoid spray drift at the time of application or vapor drift for several days after application. Spray drift can be minimized by reducing sprayer pressure, increasing water volumes with larger nozzles, and using drop nozzles to keep the spray release as low as possible and still give weed coverage. Drift potential is greater with windy or high temperature conditions.

Applications are not recommended at temperatures above 85°F. Spray and vapor drift effects on soybeans can be reduced by spraying corn early in the season when temperatures are lower and before soybeans have emerged, or when they are small. Do not graze or harvest for dairy feed prior to the milk stage of the grain if corn is treated with dicamba.

Directed Sprays

These cannot be used on small corn. Therefore, early season weed growth must be controlled by some other means (rotary hoe, harrowing, herbicides, or cultivation) to prevent yield losses from early weed competition. Directed sprays are considered emergency measures to control heavy weed stands within corn rows.

Specially designed equipment has been developed to make directed spray applications in corn. When applying directed sprays, the nozzles should be mounted so that wheels, skids, cultivator shanks, or similar devices control the nozzle height. To minimize spray contact with corn leaves, use attachments to lift the corn leaves and direct the spray to the base of corn plants and onto weeds in the row.

Directed sprays of linuron at 1½ pounds per acre can be applied when the corn is not less than 15 inches tall. Ametryne (Evik) is cleared for use as a directed spray at 1.6 to 2 pounds per acre after corn is 12 inches tall. Do not apply ametryne later than 3 weeks prior to tasseling. Ametryne should not be used on sandy soils. Adding a wetting agent is necessary for effective weed control with linuron or ametryne.

Care must be taken in application to minimize spray on the corn leaves while covering most of the weed foliage with the spray. Either chemical will kill the corn leaf tissue it contacts and, if leaf kill is extensive, corn yields may be reduced.

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