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WEED CONTROL IN CORN

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Weeds compete with corn for light, moisture and plant nutrients. If they are not controlled, yields can be drastically reduced. Proper preparation of the seedbed will kill existing weeds and provide favorable conditions for germination and early growth of the corn. A high plant population will provide effective shading to discourage weed growth later in the season. Herbicides should be used along with effective tillage and good crop management to control weeds that compete with the crop.

Cultural Practices

Recognition of a weed problem in a corn field should alert a producer to identify the weed and develop a program to combat the problem if it is detrimental to the production system. Good sanitation methods such as cleanup of equipment when moving between fields will help prevent the spread of weed seed.

Crop rotations help control annual weeds, especially if a winter annual crop is used in the rotation or a broadleaf type crop such as soybeans or mungbeans is planted. Mechanical control or herbicides help prevent the weeds from completing a life cycle and producing seed when the rotation crop is grown.

Tillage can be used to control early season weed populations, but caution is needed in not working soil when it is too wet. Post harvest tillage and herbicides can be used to help control perennial weeds such as johnsongrass. Deep tillage will bring rhizomes to the surface where they will dry out or freeze out. Several trips over the field with a disk in the late fall and winter to bring new rhizomes to the surface will increase johnsongrass control.

Herbicides can be used to control early season weed populations and allow corn to produce a leaf canopy that will compete with weeds and shade them out. Use of adapted hybrids, recommended popula-

tions and adequate fertility will also help corn compete favorably with weeds.

Several herbicides are approved for control of weeds in corn. These chemicals differ in length of time they will persist in the soil, safety to the crop and the weed species that they will control. Persistent herbicides may limit crop rotation choice. The label on the container will usually list the weeds that can be controlled by a particular herbicide and directions for the most effective use of the herbicide.

Some herbicides are better for annual grass control than for control of broadleaf weeds. Other herbicides that can be used in corn are best for control of broadleaf weeds. Many of these herbicides can be used in mixtures for grass and broadleaf weed control. These can be mixed together in the spray tank before application.

Several herbicides can only be used as preplant incorporated herbicides because they are volatile and will escape if left on the surface of the soil. Other herbicides can be used only as a preemergence application. Some of the herbicides can be used either preplant or preemergence but these chemicals are usually not incorporated as deeply as those that are only used as preplant applications. Other herbicides are available for postemergence application after the corn is growing. **It is important to develop a complete program with herbicides before the crop is planted.**

Preplant Incorporated (PPI) Herbicides

Preplant herbicides (Table 1) are applied before the crop is planted and are mixed with the soil (incorporated). It is very important to incorporate the herbicide thoroughly according to label instructions for effective weed control. Most incorporation procedures require going over the field twice, the second time at right angles to direction of travel the first time. Thorough

mixing of the herbicide with the soil is the objective of the incorporation procedure. Some herbicides will cause injury to the crop and result in poor weed control if incorporated poorly.

Table 1. Preplant Incorporated (PPI) Herbicides

Herbicide	Remarks
Sutan Plus (butylate + protectant) 3 3/4 to 7 1/3 Pt/A	Incorporate thoroughly immediately after application or meter into irrigation water as directed on the label. Follow the directions on the container for rate to use for your soil type, weed problems and environmental conditions. This herbicide alone does not control most broadleaf weeds, and should usually be used in a mixture with atrazine or Bladex.
Eradicane (EPTC + protectant) 3 3/4 to 7 1/3 pt/A	Thoroughly incorporate immediately after application or apply through irrigation system as directed on the label. The extender in Eradicane Extra allows it to provide weed control longer into the season. This herbicide controls "tough" grasses but should be mixed with atrazine or Bladex for effective broadleaf weed control.
Eradicane Sutan Plus + atrazine or Bladex	Mixing an effective grass control or herbicide with an effective herbicide to control broadleaf weeds provides a broad spectrum weed control program. Atrazine lasts longer in the soil than Bladex; therefore, read the labels before making your herbicide selections.

Sutan Plus and Eradicane must be incorporated immediately after application. Where possible, application and the first incorporation should be done in the same operation. These herbicides can be used alone or in mixtures with other herbicides such as atrazine and Bladex. In most situations when a mixture is used the rate of the grass control herbicide is reduced. This lowers the susceptibility of hard-to-control grasses such as johnsongrass, shattercane and sandbur but the mixture is effective for control of a broad spectrum of common annual grasses and broadleaf weeds.

Eradicane is usually considered a little better herbicide for control of johnsongrass seedlings, wildcane and nutsedge. However, there are more reports of injury from Eradicane, especially on light and medium textured soils.

Preemergence Herbicides

Preemergence herbicides (Table 2) are chemicals that are applied immediately after the crop is planted and before it comes up. Rainfall or irrigation is necessary to activate these herbicides. If rainfall does

not occur within a few days after application, a light cultivation will kill the weeds that have come up and mix the herbicide with the top one or two inches of soil.

Table 2. Preemergence Herbicides

Herbicide	Remarks
Dual (metolachlor) 1 1/2 to 2 1/2 pt/A	Dual may be used either preplant or preemergence and may be mixed with atrazine or Bladex for effective control of both grasses and broadleaf weeds. Dual provides some yellow nutsedge control also. See incorporation instructions on the label if this herbicide is used as a preplant application.
Lasso [†] (alachlor) 4 to 7 pt/A	Lasso may be used either as a preplant or preemergence application, but should not be incorporated deep if used preplant. Lasso may be mixed with atrazine or Bladex to increase the spectrum of weeds controlled.
atrazine 1 1/2 to 3 lb/A	Several different formulations of atrazine are available and sold under various trade names. Read the crop rotation section on the label. Do not plant crops other than corn or grain sorghum in treated fields during the same season. Atrazine should be mixed with another herbicide if annual grasses are expected to be a problem.
Bladex [†] (cyanazine) 1.2 to 3.0 lb/A	Bladex is primarily used as a preemergence application in a mixture with another herbicide that will control annual grasses. Do not use on sands or loamy sands with less than 1% organic matter. This herbicide has a very short residual in the soil.
Lasso or Dual + atrazine or Bladex	A mixture of one of these grass control herbicides and a herbicide to control broadleaf weeds should greatly improve the spectrum of weeds controlled over that with any one herbicide. The best choice will depend on weed spectrum, soil type, rotation crops and expected weather conditions. Bicep and Lariat are pre-mixes of Dual or Lasso with atrazine.

[†]Restricted use pesticide

Lasso and Dual are the most widely-used preemergence herbicides in Oklahoma for grass control. Other herbicides that are approved for use in this category are Prowl and Ramrod (propachlor). Lasso and Dual can also be used PPI if label directions are followed and they are not incorporated too deep. Surface blending is often the term used to refer to this light incorporation and will be described on the herbicide label. Prowl can be applied preemergence but should not be applied PPI, either alone or in mixtures. Heavy rainfall soon after application or failure to pack soil over the corn seed can result in injury to corn from Prowl. Ramrod is usually not effective in PPI applications.

Atrazine and **Bladex** are preemergence type herbicides that are effective for control of broadleaf weeds. Atrazine is available under several different trade names and can usually be purchased as a wettable powder or a liquid suspension. Sometimes this herbicide is used alone without a grass herbicide if crabgrass is the only grassy weed problem. If large-seeded grasses such as Texas panicum or barnyardgrass are problems, the most effective control usually results from a mixture with another herbicide.

Atrazine may sometimes remain in the soil and damage certain crops the following season. If atrazine is used in the spring, do not plant small grains, small-seeded legumes or vegetables the next fall or spring.

Bladex does not carry over in the soil as long as atrazine. It should not be used on sandy soils or soils low in organic matter. Crop tolerance does not appear to be as good as with atrazine. However, some growers like to use a short residual herbicide so that they can rotate to another crop in the fall or the next year.

A choice of which preemergence herbicides to use depends on the weed problem, the crop rotation, the soil type, the equipment available for application, and to some degree, the farmer's preference. If severe weed infestations are a problem on a farm, it might be wise to try a small acreage of two or three different herbicide combinations to determine which one will provide the most effective control of the weeds growing on that farm. The best combination should be a mixture of one of the grass control herbicides with either atrazine or Bladex. Premixes are available for several of the suggested tank mixtures. **Bicep** is a premix of Dual and atrazine. **Lariat** is a premix of Lasso and atrazine. **Prozine** is a mixture of prowl and atrazine. Ramrod can also be used in mixtures with atrazine. Producers should compare the cost of individually packaged chemicals that they can tank-mix with premixes at the same rate of active ingredient per acre.

Band Application vs Broadcast

Band application of preemergence herbicides can provide acceptable weed control while reducing costs if appropriate cultivation is used to control weeds in the row middles. This method will generally use about one-third to one-half as much herbicide as compared to broadcast application. Proper application methods, identification of weed populations for aid in choice of herbicides and ability to cultivate between rows are management steps necessary to be successful with band applications. Cultivation between the rows must be an integral part of the system until the crop canopy effectively shades the weeds for this program to work.

Postemergence Herbicides

Postemergence herbicides (Table 3) are applied

after the crop and the weeds have come up. Some of these herbicides can be very effective in completing a weed control program where preplant or preemergence herbicides have not given complete control or have not lasted long enough into the season. It is usually not wise to depend only on postemergence herbicides. Timing is critical in applying these chemicals. If wet ground or other problems arise to prevent application at the time the herbicide should be applied, it may be difficult or even impossible to completely control the weeds.

There are no approved herbicides that can be applied postemergence in corn to kill existing grasses. Prowl and Treflan can be used in combination with cultivation, but these tools must be used together to be effective.

Some of the postemergence herbicides kill weeds by contact type action. These include bromoxynil, Basagran, dinitro and Paraquat. Temperature at time of application, size of the weeds and thorough weed coverage with the spray all contribute to the success or failure from application of these herbicides.

Postemergence herbicides such as 2,4-D, Banvel, atrazine and Bladex that are taken up by the plants are effective with little or no injury to the corn if applied at the right stage of growth. Timing of application is a very important factor for both crop safety and effective weed control with the use of these chemicals.

Table 3. Postemergence Herbicides

Herbicide	Remarks
2,4-D amine 1/6 to 1/2 lb/A	Apply when weeds are small for broadleaf weed control. Drop nozzles should be used if the corn is more than 8" high. Corn is often brittle and will break easily for 7-10 days after application. Corn hybrids vary in their sensitivity to 2,4-D. Covering brace roots with soil before 2,4-D application also helps to reduce injury.
Banvel (dicamba) 1/2 to 1 pt/A	This herbicide also controls broadleaf weeds. It may be applied until the corn is 36 inches tall or until 15 days before the tassels appear. A mixture of Banvel and 2,4-D with lower rates of each is a good combination for broadleaf weed control. Banvel is most effective when applied to weeds less than 2 inches tall.
atrazine 1 to 3 lb/A	Atrazine can be applied early post emergence to corn either alone or in certain tank mixtures. It should be applied to grassy weeds before they are beyond 1/2 inch tall for the most effective control. Many of the annual broadleaf weeds can be treated up to 2 to 4" tall. The addition of nonphytotoxic oils or surfactants can increase the effectiveness of post-emergence atrazine, but may also increase corn susceptibility to the herbicide.

Table 3 (continued)

Bladex[†] (cyanazine) 1 to 2 lb/A	Bladex is registered for postemergence use but the corn should not exceed the 4-leaf stage of growth. Do not add wetting agents or oil unless instructed on the label to do so.
Basagran (bentazon) 1 1/2 to 2 pts/A	Basagran is a selective herbicide for control of certain broadleaf weeds and nutsedge in corn. It is effective for smartweed control. It is important to apply the Basagran at the right weed height, as indicated on the label. Thorough coverage of all weeds with the spray is very important. Laddok is a premix of Basagran and atrazine.
Buctril 2E[†] (bromoxynil) 1 to 1 1/2 pt/A	Apply to weeds when two to four inches tall and when corn is beyond the 2-leaf stage but before it reaches 14 inches tall. Good, thorough coverage is essential since it is a contact herbicide.
Prowl (pendimethalin) 1 to 3 pt/A Culti-Spray	Postemergence culti-spray applications involve covering the roots of the corn, then applying the herbicide and following with light incorporation. This treatment controls late-germinating grasses and small seeded broadleaf weeds. Prowl may be used preemergence if directions on the label are followed very closely.
Treflan, Trilin (trifluralin) 3/4 to 2 pt/A	Cultivate before Treflan application, apply Treflan after cultivation and incorporate according to label directions soon after application in corn that is at least 8 inches tall. Treflan can cause severe corn injury if applied before the corn root system is well developed.
Evik (ametryn) 0.6 to 2.0 lb/A [directed only]	Apply as a directed spray after corn is at least 12 inches tall. Adjust rate and use surfactant according to label directions.
Gramoxone Extra[†] paraquat 12.8 fl oz/A [directed only]	Apply when corn is at least 10 inches tall and weeds are less than 4 inches. This herbicide can be mixed with atrazine to increase the spectrum of weeds controlled.
Lorox Linuron 2 lb/A [directed only]	Apply when corn is 12 to 18 inches tall. Be sure to add wetting agent and follow application directions.

[†]Restricted use pesticide

The pesticide information presented in this publication was current with federal and state regulations at the time of printing. The user is responsible for determining that the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label directions. The information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Cooperative Extension Service is implied.



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Roundup (glyphosate) is approved for use for johnsongrass control prior to planting corn. However, the johnsongrass should be 18 inches tall to early bloom stage before Roundup application. Delay tillage for 7 days after treatment. Roundup can also be used at a low rate to kill weed seedling weeds prior to planting of the crop. It can also be used postharvest to kill weeds before planting another crop. Honcho is another formulation of glyphosate that requires addition of surfactant at the time of application.

Gramoxone Extra (Paraquat) can be used preplant or preemergence to kill weed seedlings that germinate before the crop emerges. This is a useful herbicide for killing weed seedlings on beds that have been prepared in irrigated corn when it is desirable not to work the beds before planting. Be sure to follow the instructions on the label when using this herbicide. It does not carry over in the soil to give later weed control so a residual type of herbicide must be used to control weeds that germinate later.

Publications

There are several Fact Sheets available in your County Extension Offices that may be helpful to you in understanding, selecting and using herbicides in a weed control program.

- **Selecting the Proper Nozzle Type and Size for Low Pressure Ground Sprayers, OSU Extension Facts 1215.**
- **Calibrating a Low Pressure Ground Sprayer, OSU Extension Facts 1216.**
- **The Low Pressure Ground Sprayer, OSU Extension Facts 1217.**
- **Pumps for Low Pressure Ground Sprayers, OSU Extension Facts 1218.**
- **Guide to Effective Weed Control, OSU Extension Facts 2750.**
- **Johnsongrass Control in Oklahoma, OSU Extension Facts 2753.**
- **Bindweed Control in Oklahoma, OSU Extension Facts 2755.**
- **Factors Affecting Herbicide Performance, OSU Extension Facts 2768.**
- **Check Your Pesticide Labels, OSU Extension Facts 7454.**
- **Toxicity of Pesticides, OSU Extension Facts 7457.**