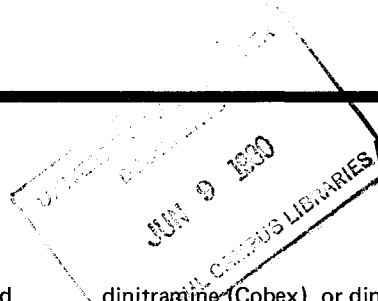


**AGRICULTURAL CHEMICALS
FACT SHEET No. 13-1980
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Weed Control in Dry Beans

Dry beans are sensitive to weed competition. Early weed growth reduces bean yields by competing for light, moisture, and nutrients. Weeds also are likely to cause a buildup of disease and/or insect problems that may affect bean growth and development adversely. Weeds increase harvest losses and reduce bean quality. Cultivation or other tillage sometimes controls weeds adequately without the use of herbicides. However, weeds usually are not controlled adequately in the row and use of herbicides with tillage is necessary.

How Beans Grow

Dry beans grown in Minnesota include five common bean (*Phaseolus* sp.) classes: navy, pinto, kidney, pink, and small red, as well as the adzuki bean (*Vigna* sp.). All common beans emerge by elongation of the hypocotyl (portion of the stem below the cotyledons or seed leaves), which "crooks" or arches through the soil and then straightens out with unfolding cotyledons. These common beans emerge quite rapidly (usually within 7 to 10 days) if planted in warm soil (50° F or higher) in late May or early June in Minnesota. However, earlier planting may delay emergence.

Adzuki beans, on the other hand, emerge by elongation of the epicotyl (portion of the stem above the cotyledons), and the cotyledons (seed) remain below the soil surface. Adzuki beans emerge more slowly than common beans, usually 10 to 14 days in warm soils and 15 to 20 days in cold soils. Because of the type and time required for emergence, adzuki beans are more susceptible to injury from preplanting or preemergence herbicides. For example, EPTC (Eptam), alachlor (Lasso),

dinitramine (Cobex), or dinoseb (Premerge) can be used on common beans but should not be used on adzuki beans (table 2). Because of slower bean emergence and less early season crop competition, weed control is more critical with adzuki beans than with common beans.

Cultivation

Before emergence, dry beans can be spike-toothed harrowed to kill emerging weeds. The weeder, rotary hoe, or flexible-tined harrow are safer to use after bean emergence than the spike-toothed harrow. More than one harrowing may be necessary.

After the beans emerge, they develop quite rapidly and progress through the cotyledon stage (or plumule stage in the adzuki bean) to the fully expanded unifoliolate leaf stage and then to the first and subsequent trifoliolate (3-part) leaves. Beans differ in canopy growth. Most navy and adzuki bean varieties are erect or "bush" type. Most pinto, pink, and small red bean varieties are prostrate vines, although bush or semi-vine types of small red and pinto are available.

Dry edible beans may be cultivated once or twice to control weeds; however, cultivation should be shallow to avoid damaging the rather shallow root systems. Cultivation or harrowing should not be done when the bean foliage is wet because bacterial diseases may be spread. Beans are hilled at the last cultivation to allow use of bean pullers. However, if beans are to be direct-combined or swathed, the last cultivation should leave the field as level as possible.

Table 1. Effectiveness of herbicides on major weeds in dry beans¹

Weed	Preplant Incorporated					Preemergence		Postemergence
	alachlor (Lasso)	EPTC (Eptam)	trifluralin (Treflan)	profluralin (Tolban)	dinitramine (Cobex)	chloramben (Amiben)	dinoseb (several names)	bentazon (Basagran)
Grasses								
green foxtail	G	G	G	G	G	G	F	N
yellow foxtail	G	G	G	G	G	G	F	N
giant foxtail	G	G	G	G	G	F	F	N
barnyardgrass	G	G	G	G	G	G	F	N
wild oat	P	F	P	P	P	P	P	N
quackgrass*	N	P	N	N	N	N	N	N
Broadleaves								
common lambsquarters	G	F	G	G	G	G	G	P
pigweed	G	F	G	G	G	G	G	P
wild mustard	P	P	N	N	N	F	G	G
smartweed	P	P	P	P	F	G	F	G
common ragweed	P	F	N	N	N	G	G	G
kochia	P	F	G	G	G	F	G	P
velvetleaf	P	F	N	N	N	F	F	G
cocklebur	P	P	N	N	N	P	F	G
black nightshade	G	F	P	P	F	F	F	F
Canada thistle*	N	N	N	N	N	N	N	G

¹ G = good control, F = fair control, P = poor control, N = no control.

*Glyphosate (Roundup) is for use in fields before planting dry beans and for spot treatment where these perennial weeds are a problem.

Table 2. Summary of herbicides for use on dry beans (includes navy, pinto, pink, small red, adzuki)¹

Herbicide	Lbs/A of active ingredient or acid equivalent broadcast	Time of application ²	Remarks
chloramben (Amiben)	2 to 3	Pre	<i>Use lower rate on adzuki beans.</i>
EPTC (Eptam)	3 to 4	PPI	<i>Do not use on adzuki beans. Do not exceed 3 lbs/A on coarse-textured soils.</i>
trifluralin (Treflan)	1/2 to 1	PPI	Use lower rates on coarse-textured soils, higher rates on medium and fine-textured soils.
profluralin (Tolban)	1/2 to 1	PPI	Use lower rates on coarse-textured soils, higher rates on medium and fine-textured soils.
dinitramine (Cobex)	1/2 to 2/3	PPI	<i>Do not use on adzuki beans.</i> Use lower rates on coarse-textured soils, higher rates on fine-textured soils.
alachlor (Lasso)	2 1/2 to 3	PPI	<i>Do not use on adzuki beans.</i>
bentazon (Basagran)	3/4 to 1	Post	Beans in first trifoliolate, weeds small.
dinoseb or DNBP (Premerge, others)	9	Pre	Do not use on sandy soils. May be applied at crook stage at 3 to 4 1/2 lbs/A (see label). <i>Do not use on adzuki beans.</i>

¹ For more information on weed control in dry edible beans, see *Cultural and Chemical Weed Control in Field Crops*, University of Minnesota Extension Bulletin 400.

² Pre = preemergence, PPI = preplant incorporation, Post = postemergence.

Herbicides

For effective weed control in dry edible beans, any weeds present should be identified, and the best herbicide or herbicide combination should be selected (tables 1 and 2). For preplanting incorporation, several herbicides are available that give good annual grass control and fair-to-good control of some annual broadleaves. These herbicides are EPTC (Eptam), trifluralin (Treflan), profluralin (Tolban), dinitramine (Cobex), and alachlor (Lasso). Thorough incorporation requires two tillage operations at right angles, with most tillage implements.

Two herbicides, chloramben (Amiben) and dinoseb or DNBP (several trade names), are available for preemergence use to control a wide range of annual broadleaf weeds with fair-to-good control of some annual grasses. If sufficient rainfall does not occur within 7 days after applying chloramben, use a shallow cultivation to kill germinating weeds and incorporate the herbicide. If rain is not expected, chloramben may be incorporated shallowly (1 to 2 inches deep) right after application. Dinoseb may be applied at a lower rate as the beans are emerging and up to the crook stage (table 2). Bentazon (Basagran) for broadleaf weed control is applied when weeds are small and after beans reach the first trifoliolate leaf stage.

Summary

A weed control program should be based on the kind of beans, the weed species in the field, the soil type, the type of tillage, and any irrigation. Herbicide costs and expected bean yields also should be considered. If perennial or other weeds that cannot be controlled by tillage or a labelled herbicide are present, a more competitive crop than beans should be planted. Total weed control is neither probable nor necessary. However, adequate weed control, especially for the first 3 to 4 weeks, is required for profitable dry bean production.

Table 3. Herbicide names and formulations

Common name	Trade name	Concentration ¹
alachlor	Lasso	4 lb/gal L
bentazon	Basagran	4 lb/gal L
chloramben	Amiben	2 lb/gal L, 10% G
dinitramine	Cobex	2 lb/gal L
dinoseb (DNBP)	Premerge, others	1, 3, 5 lb/gal L, 10% G
EPTC	Eptam	7 lb/gal, 10% G
profluralin	Tolban	4 lb/gal L
trifluralin	Treflan	4 lb/gal L, 5% G

¹ L = liquid, G = granular.

The information given in this publication 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 Minnesota Agricultural Extension Service is implied.

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