

University of Missouri Extension

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Soybean Harvest Aids

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Harvest problems

Soybean harvest can be filled with problems. Weeds, particularly green weeds:

- Can slow the speed of harvest,
- Cause combine problems,
- Result in excessive combining losses,
- Result in docking for moisture and quality when sold, or
- Create problems if soybeans are stored.

Table 1

Effect of weeds on soybean yields and harvesting efficiency¹

Weed infestation	Speed of combine	Preharvest loss	Shatter loss	Stubble loss	Lodge loss	Stalk loss	Total header loss	Threshing and separating loss	Total loss	Total yield
1968										
Pigweed	1 mph	0.40 percent	2.43 percent	0.81 percent	0.43 percent	1.92 percent	5.59 percent	0.68 percent	6.67 percent	43.9
	2 mph	0.36 percent	2.52 percent	2.12 percent	0.56 percent	1.74 percent	6.94 percent	2.06 percent	9.36 percent	48.9
	3 mph	0.18 percent	3.06 percent	1.80 percent	0.70 percent	2.38 percent	7.94 percent	4.38 percent	12.50 percent	42.3
Weed free	2 mph	0.13 percent	3.29 percent	1.03 percent	0.84 percent	1.78 percent	6.94 percent	0.35 percent	7.42 percent	60.3
	3 mph	0.17 percent	2.69 percent	0.97 percent	0.48 percent	2.05 percent	6.19 percent	0.48 percent	6.84 percent	61.0
	4 mph	0.06 percent	3.81 percent	0.15 percent	0.74 percent	2.69 percent	7.39 percent	0.34 percent	8.80 percent	60.8
1969										
Pigweed	1 mph	0.30 percent	2.93 percent	1.20 percent	0.91 percent	4.36 percent	9.40 percent	1.15 percent	10.85 percent	39.6
	2 mph	0.36 percent	3.50 percent	1.69 percent	1.66 percent	5.77 percent	12.62 percent	0.85 percent	13.83 percent	37.2

	3 mph	0.26 percent	2.44 percent	1.82 percent	0.94 percent	5.39 percent	10.59 percent	1.29 percent	12.14 percent	39.7
Foxtail	1 mph	0.31 percent	3.40 percent	0.77 percent	0.47 percent	1.68 percent	6.32 percent	0.98 percent	7.61 percent	47.2
	2 mph	0.23 percent	3.33 percent	1.39 percent	0.81 percent	1.96 percent	7.49 percent	1.10 percent	8.82 percent	45.6
	3 mph	0.29 percent	3.49 percent	1.38 percent	0.52 percent	2.02 percent	7.41 percent	1.45 percent	9.15 percent	51.0
Weed free	2 mph	0.23 percent	2.27 percent	0.66 percent	0.42 percent	1.96 percent	5.31 percent	0.25 percent	5.79 percent	54.7
	3 mph	0.18 percent	2.19 percent	0.99 percent	0.07 percent	1.70 percent	4.95 percent	0.29 percent	5.42 percent	55.4
	4 mph	0.17 percent	3.24 percent	0.38 percent	0.54 percent	2.15 percent	6.31 percent	0.57 percent	7.05 percent	56.2

¹Nave, W.R. and Wax, L.M. 1971. Effect of weeds on soybean yields and harvesting efficiency. *Weed Sci.* 19 (5): 533-535. University of Illinois.

Data in Table 1 from the University of Illinois show how weeds affect soybean yields and harvest losses.

Except when they have large stems, dead weeds usually cause only minor harvest problems. But unfortunately, only a hard frost will stop the growth and dry up some weeds. However, the average date of the first hard frost in most parts of Missouri is relatively late compared to the average date of soybean maturity and harvest (Figures 1 and 2). Delaying harvest until after a hard frost could result in shattering losses, further delays due to wet weather, delayed wheat planting, and delayed fall tillage. Weed problems could also be more serious in following years because of the extra time weed seeds have to reach maturity.

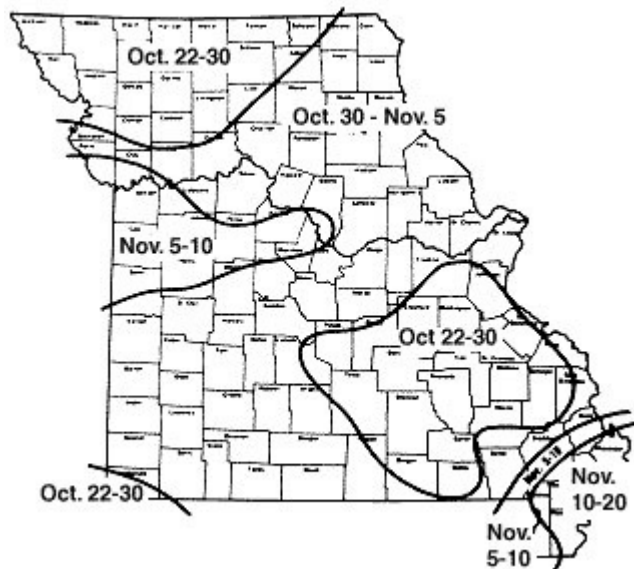


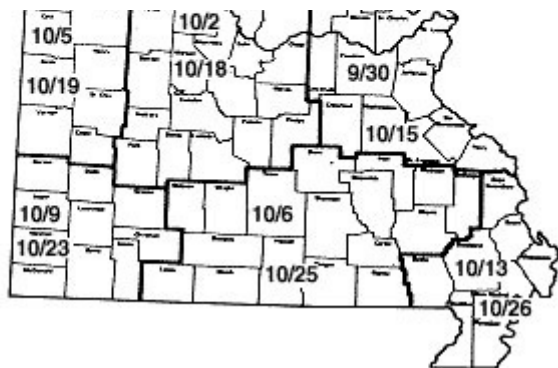
Figure 1

Average first occurrence of 28 degrees Fahrenheit in the fall.



Figure 2

Average date of soybean maturity (top number) and average date of harvest (lower number).



Cultural practices to reduce harvest losses from weeds

Properly adjusting the various combine settings is very important when weeds are present in soybeans. Because weed infestations vary, each field will require different adjustments.

As indicated in Table 1, combining speed is one way to reduce harvest losses due to weeds. When combine speeds were reduced to 1 mph, there was little difference between the weedy and weed-free areas. However, such a low speed on a large acreage may cause significant delays in harvest.

Determining the need for weed desiccation

Several herbicides are labeled for the desiccation of green weeds in soybeans. These herbicides may also aid in the desiccation of soybeans, but don't buy them especially for this use. Results have been unpredictable and do not economically justify their use for this practice.

Determine the need for desiccants by considering:

- Green weed infestation,
- Soybean maturity and calendar date,
- Potential soybean yield and price, and
- Subsequent crop or field practices.

Weed infestation

No extensive data are available on the numbers of various weeds that cause significant soybean yield and quality loss. It is more difficult yet to estimate the losses for dockage or losses in storage. Experience is often a good indicator.

Here are some harvest loss estimates from the study reported in Table 1 that may help:

- Approximately two pigweeds per foot of 30-inch row resulted in about a 7 percent harvest loss at 2 to 3 mph combine speed.
- About 2.5 foxtail plants resulted in a 3 to 4 percent loss.
- A slightly lower loss occurred with a similar pigweed infestation in the first year of research.

Some weeds, such as drought-stressed cocklebur and others, are not affected much by desiccants. Weeds with juicy berries, such as black nightshade, may be killed by desiccants, but the berries may still cause problems with combine operation.

Maturity and calendar date

The relationship of soybean maturity and calendar date affect the need for chemical application. Soybeans that will be mature enough to harvest within a week of the expected date of the first hard frost probably would not benefit from weed desiccation (Figure 1). Soybeans that will mature more than two weeks before the average date of the first frost may benefit if weeds are a problem.

Soybeans maturing in late September are often candidates for application because waiting until frost in October may result in shattering losses, and the soybean harvest may occur when wet weather is more

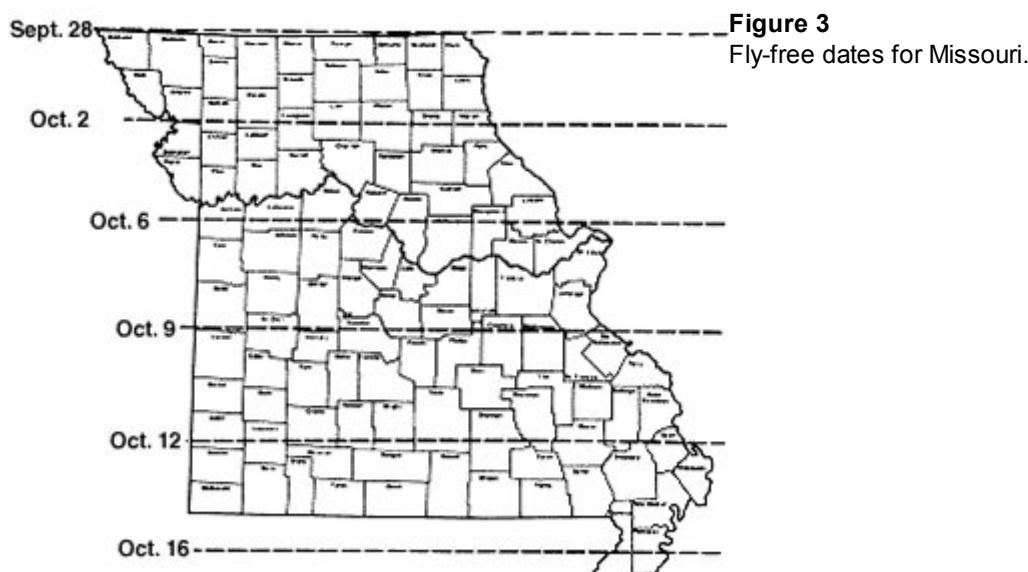
frequent.

Yield and price

Soybean yield and price potential also affect the economical potential of weed desiccation. Usually, the greater the yield and prices expected, the greater the probability for an economical return. Yields of less than 20 and prices of less than \$6 per bushel seldom justify weed desiccation. Consider dockage, harvest efficiency, storage problems, timeliness and next year's weeds in the economics.

Field work and fall planting

Whether a small grain crop will follow soybeans or there is a need for fall tillage affects the economics. Usually, the best wheat planting date is about the same date as the fly-free date (Figure 3). Other small grains are planted earlier. These dates occur about two weeks before the frost dates (Figure 1). Therefore, this suggests a need for desiccants where green weed infestation is severe. This desiccation could also make seedbed preparation less difficult because it reduces the amount of tillage and makes the seeding operation easier.



Herbicide application

At this time, only four herbicides are labeled for weed desiccation in soybeans: paraquat, sodium chlorate, diquat and dinoseb. The latter two are only for use on soybeans that will be used for seed. Check for the registration of new products.

Timing

The time of application varies slightly among these herbicides. For all of them, the timing is based on the soybean growth stage, and application must take place after soybeans reach stage R7; that is, physiological maturity. That means at least 50 percent of the plants have at least one pod that has reached its mature pod color. Because of the possibility of chemical residues remaining in the seed, application of some herbicides should be made later.

Read the label for more detail on application time, rate and method of application.

Paraquat

(trade name: **Ortho Paraquat +; Gramoxone**)

Apply 1/2 to 1 pint per acre on broadleaf weeds and weed grasses. Use the high rate on cocklebur. Add 1

quart ORTHO X-77 Spreader or other non-ionic spreader per 100 gallons spray.

- **Aerial application**
2 to 5 gallons spray per acre.
- **Ground application**
20 to 40 gallons spray per acre.
- **Indeterminate soybean varieties**
Apply when at least 65 percent of the seed pods have reached mature brown color or when seed moisture is 30 percent or less.
- **Determinate soybean varieties**
Apply when soybean plants are mature; that is, when beans are fully developed and at least half the leaves have dropped, and when leaves left on the plants are turning yellow.

Immature soybeans will be injured.

Mature cockleburs, especially drought-stressed plants, are tolerant to paraquat and desiccation will not be complete.

Sodium chlorate (several trade names)

To desiccate weeds in early-maturing soybeans and make the harvest easier, apply 2 gallons of sodium chlorate in enough water to give thorough coverage, preferably by air. Make application seven to 10 days before anticipated harvesting date when beans are mature and ready for harvest. For air application, use 7 to 10 gallons of total solution per acre.

Diquat (Seed crops only)

1-1/2 to 2 pints per acre. Use specified dosage in 15 to 30 gallons of water for ground spray application and 5 to 10 gallons of water by air. Apply one week before harvest.

Dinoseb (trade name: DOW General Weed Killer) (Seed crops only).

Apply three to six days before harvest. For airplane application, use 2 to 3 pints of DOW General Weed Killer in 4 to 10 gallons of diesel oil or weed oil per acre. With ground equipment, use 2 to 3 pints of DOW General Weed Killer in 8 to 15 gallons of diesel oil or weed oil for low volume sprays. Or mix with 5 to 15 gallons of either oil or water to make 30 to 50 gallons of spray per acre for high volume sprays. The higher rates and volumes are suggested for use during cool, cloudy weather or where there is heavy foliage growth.

Special precautions

All labeled desiccants have restrictions concerning the use of treated fields for grazing or harvested feed for livestock. With paraquat, don't allow livestock to graze within 15 days of application. Livestock must be removed from treated fields 30 days before slaughter. All other herbicides do not permit any grazing or feeding of soybean residue.

Harvest of soybeans should occur as soon after weed desiccation as possible, preferably within a week of herbicide application.

Related MU Extension publications

- G4871, Waterhemp Management in Missouri
<http://extension.missouri.edu/publications/DisplayPub.aspx?P=G4871>
- M123, Missouri Soybean Handbook
<http://extension.missouri.edu/publications/DisplayPub.aspx?P=M123>

Order publications online at <http://extension.missouri.edu/explore/shop/> or call toll-free 800-292-0969.



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