



IPM-0413

Soybean

Insect, Disease, Nematode, and Weed Control
Recommendations for 2017



INSECT CONTROL

For effective and economical insect control on soybeans, check beans periodically for the presence of insects. Scouting is especially important from the time of blooming until the beans are mature in the pods. Examine both foliage and pods to determine the number and kinds of insects present. The count will enable you to decide when sufficient numbers are present to justify control. The kinds of insects present will indicate which insecticide to use.

Seedling- and Stem-Feeding Insects

Cutworms are the larvae of night-flying moths. When fully grown, they are nearly 2 inches long. Several species attack soybeans. Larvae are fat, greasy, and dark-colored. They hide beneath the soil's surface during the day and then emerge at night to feed. Cutworms usually feed on portions of the stem rather than the foliage. Feeding results in leaves being clipped or plants being cut.

Three-cornered alfalfa hoppers are green, triangular insects that jump when disturbed. Both nymphs and adults suck juice from plants and can occur in damaging numbers on soybeans. The nymphs are particularly damaging because they gradually work their way around the stems as they feed. Their feeding girdles the plants and either kills them outright or weakens them so that they later fall over and die. The girdling takes place near ground level. Cruiser Maxx and Gaucho 600 insecticide seed treatments provide early season control. Once beans are 10 inches tall, feeding can occur on petioles of leaves, stems, and pods.

Lesser cornstalk borers are the slender, brownish-green, cross-striped, active larvae of small, brownish-gray moths. The eggs are laid on the stems of seedling plants. After hatching, the larvae bore into the young stems and burrow up and down inside the stems. The burrowing weakens the stems and causes the plants to fall over and die. The larvae construct tubes of sand, silk, and excrement which lie horizontally in the soil and are attached to the stems at the worms' entrance holes. The larvae leave the plants through these tubes when the plants die.

Grasshoppers have emerged as a pest of soybeans in recent years, primarily in conservation tillage systems. They chew the main stems of young plants, causing a reduction in stands. Soybeans are most susceptible to grasshopper injury from the time they emerge until the plants have about six leaves. Both the immature and the adult stage may cause injury. Controls are warranted when stands are threatened or more than one-third of the leaves are lost.

Kudzu bug is a new pest of soybeans that has been found in every county in Alabama. This insect is about 0.25 inch long. It is light brown in color with an olive green hue and dark specks.

Its life cycle takes 6 to 8 weeks, depending on the temperature. This insect overwinters as an adult and can survive very cold winters. Kudzu appears to be an important early season reproductive host, but it is not required for a soybean field to be infested. Kudzu bug numbers tend to be much higher on full-season soybeans than on later planted fields. Immatures normally appear in full-season soybeans in early to mid July. Kudzu bug adults and nymphs feed on the main stem and leaf petioles with sucking mouthparts. Kudzu bug's feeding can reduce the number of pods per plant, number of seeds per pod, and seed size. Kudzu bug has been found to cause significant yield losses in soybeans.

Foliage-Feeding Insects

Velvetbean caterpillars are the larvae of small night-flying moths which overwinter in the tropics and in southern Florida. Adults migrate into Alabama in June and begin laying eggs on soybeans. The larvae are slender and multicolored with faint white stripes down the sides. They wiggle freely when disturbed. They are serious foliage feeders.

Fall armyworms are similar in appearance to corn earworms and are the larvae of small, night-flying moths. The larva has a prominent white inverted Y-shape on its head. Fall armyworms generally eat foliage and are easily seen and collected. They occur sporadically. Also, they are voracious feeders and can strip off leaves and tender stems very rapidly.

Soybean loopers (cabbage loopers) are serious defoliators of soybeans in Alabama. They are the larvae of small, dark-gray, night-flying moths. The larva is a slender, "cabbage green" worm that forms loops or humps as it crawls. When fully grown, it is 1 to 1.5 inches long. It feeds on foliage and is most often a pest from August through September. However, it may occur earlier in the season.

Green cloverworms are semi-loopers. The worm is green with three pairs of prolegs. It has two narrow, white stripes down the side. It is about 1.25 inches long when fully grown. The worm is very active when disturbed.

Blister beetles are elongated, soft-winged beetles about 0.5 to 0.75 inch long. They are usually black and yellow striped but may be black or gray. They are generally foliage feeders that occur occasionally. Large populations may occur in isolated parts of a soybean field. These beetles feed gregariously and are easily seen.

Mexican bean beetles are reddish to yellow with sixteen black spots on the back and are about 0.25 inch long. Both the adult beetle and the spiny, orange or yellow larva skeletonize soybean leaves and sometimes feed on the pods. Mexican bean beetles are larger than the beneficial ladybug beetle, which they resemble. Large populations can cause significant defoliation.

Bean leaf beetles are reddish to yellow, usually with three or four black spots on each wing cover and a black border on the outside edge. They feed on soybean leaves and also on small pods.

Beet armyworms, close relatives of fall armyworms, are general feeders that attack soybean foliage and stems. The beet armyworm overwinters as a pupa in most of Alabama. In warmer areas, such as Baldwin County, it may overwinter as the adult moth. It has a wingspread of about 1.25 inches. The forewings are grayish brown with a pale spot in the mid-front margin. The hind wings are white with a dark front margin. The female begins to lay eggs in early spring. She deposits them in masses of about 80 eggs covered with hairs and scales from her body. She may lay as many as 500 to 600 eggs over a 4- to 10-day period. The eggs hatch in 2 to 5 days, and the larvae feed for about 3 weeks, spinning light webs over the foliage and passing through five stages.

The mature larva, about 1.25 inches long, is green with dark lateral stripes and a black dot above the second pair of legs behind the head. It usually pupates in the upper 0.25 inch of the soil in a cell made by putting soil particles and trash together with a sticky solution. The entire life cycle from egg to adult is about 36 days at 80°F. There usually are three to four generations each year in Alabama. They are extremely difficult to control with insecticides.

Pod-Feeding Insects

Podworms and stink bugs are perhaps the most important insects that attack soybeans. They may attack the beans from bloom (pod set) to pod maturity.

Podworms (bollworms, corn earworms) are probably the most destructive soybean insects because their feeding directly reduces yields. They usually occur from late July until mid September after the adults (small brown moths) have left corn fields. The small worms usually start feeding on the blooms and then eat into immature pods and destroy many beans. One worm can attack many pods. Podworms vary from green to brown and are about 1.25 inches long when fully grown. They roll up, drop to the soil, and play dead when touched.

Stink bugs include several shield-shaped bugs that may be brown or green, depending on the species. Both nymphs and adults suck juice from soybean pods, causing discoloration of the beans and subsequent reduction in grade. Heavy populations of stink bugs may occur in isolated parts of a soybean field; unless fields are closely examined, such infestations may go unnoticed. Beans are susceptible to stink bug damage up to maturity.

How to Identify Worms in Soybeans

You can distinguish the more important species of worms that attack soybeans by looking at their prolegs. Most caterpillars have four pairs. Green cloverworms have only three pairs and loopers have two pairs.

Table 1. When to Treat for Soybean Insects

Insects	When to Treat
Seedling- and Stem-Feeders <i>Three Corner Alfalfa Hopper</i>	When pests or damage is noted and stands are threatened. Once soybeans become 10 inches tall, treat three-cornered alfalfa hoppers when you catch an average of two hoppers per sweep across two rows with a 15-inch diameter sweep net.
<i>Kudzu Bugs</i>	Prior to first bloom, treat when there is an average of five kudzu bugs per plant for the whole field. After first bloom through R6, apply insecticide when sweep-net sampling catches either (1) 10 adults per sweep or (2) one nymph per sweep. If immature kudzu bugs are easily and repeatedly found on petioles and main stems during visual inspections of the canopy, treatment is likely warranted. Do not bias all sampling to border rows where populations build initially. Border treatments in some cases have slowed movement of adults across fields. Retreatment may be necessary when a treatment is applied before migration into soybeans stops. (During 2013 kudzu bugs continued to migrate into soybean plots at Prattville through the third week of July.) Be aware that spraying for kudzu bugs will significantly reduce beneficial insects, which could result in economic infestations of caterpillars.
Foliage-Feeders	During Pre-Bloom: Prevent greater than 35-percent leaf loss. From Pod Set To Maturity: Prevent greater than 20-percent leaf loss. Treat prior to 20-percent leaf loss when five to eight soybean loopers or velvetbean caterpillars, 0.25 inch long or longer, are present per foot of row. Treat when you catch an average of 1.5 worms per sweep. Soybean loopers are harder to dislodge with a sweep net and each looper should be counted twice. Each larva eats a high percentage of the total amount of foliage it consumes during the last 4 to 5 days of the larval cycle.
Pod-Feeders <i>Podworms</i>	Between Blooming and Pod Maturity: When they average one per row foot or three per 15 sweeps.
<i>Stink Bugs</i>	
Green, Southern Green, Brown, Brown Marmorated	Bloom to Mid-Pod Fill: When they average one per 3 row feet or 2 per 15 sweeps. After Mid-Pod Fill: When they average one per row foot or 3 per 15 sweeps.
Redbanded	Bloom to Pod Fill: When they average one per 3 row feet or two per 15 sweeps

Table 2. Soybean Insect Control

Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
BEET ARMYWORMS				
chlorantraniliprole PREVATHON 0.43	14–20 oz.	0.047–0.067	1	Treatment: <i>Pre-Bloom</i> —Prevent greater than 35-percent leaf loss. <i>Pod Set to Maturity</i> —Prevent greater than 20-percent leaf loss.
indoxacarb STEWARD 1.25 SC	9.2 oz.	0.09	14	
methomyl LANNATE 2.4LV LANNATE 90SP	1.5 pt. 0.5 lb.	0.45 0.45	14 14	
methoxyfenozide INTREPID 2F	4–8 oz.	0.06–0.12	14	
methoxyfenozide + spinetoram INTREPID EDGE	4–6.4 oz.	0.093–0.15	28	
spinosad BLACKHAWK	1.7–2.2 oz.	0.038–0.0495	28	
thiodicarb LARVIN 3.2F	1.5 pt.	0.6	28	
BLISTER BEETLES				
beta-cyfluthrin BAYTHROID XL 1EC	1.6–2.8 oz.	0.0125–0.02	45	Treatment: <i>Pre-Bloom</i> —Prevent greater than 35-percent leaf loss. <i>Pod Set to Maturity</i> —Prevent greater than 20-percent leaf loss.
carbaryl SEVIN 4F, XLR PLUS	1–2 pt.	0.5–1.0	21	
gamma-cyhalothrin PROLEX	1.28–1.54 fl.oz.	0.0125–0.015	30	
lambda-cyhalothrin KARATE Z 2.08 CS	1.6–1.92 oz.	0.025–0.03	45	
zeta-cypermethrin MUSTANG MAX 0.8EC	2.8–4 oz.	0.0175–0.025	21	
CUTWORMS				
alpha-cypermethrin FASTAC 0.83	1.3–3.8 oz.	0.008–0.025	21	Treat when pests or damage is noted and stands are threatened
beta-cyfluthrin BAYTHROID XL 1EC	0.8–1.6 oz.	0.007–0.013	45	
bifenthrin BRIGADE 2EC DISCIPLINE 2EC	2.1–6.4 oz. 2.1–6.4 oz.	0.033–0.1 0.033–0.1	18 18	

Table 2. Soybean Insect Control (cont.)

Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
CUTWORMS (cont.)				
chlorpyrifos LORSBAN 4EC	1 qt.	1	28	
esfenvalerate ASANA 0.66EC	5.8 oz.	0.03	21	
gamma-cyhalothrin PROLEX	0.77–1.28 fl.oz.	0.0075–0.0125	30	
lambda-cyhalothrin KARATE Z 2.08 CS	0.96–1.6 oz.	0.015–0.025	30	
permethrin AMBUSH 2EC POUNCE 3.2EC	3.2–6.4 oz. 2–4 oz.	0.05–0.1 0.05–0.1	60 60	
thiodicarb LARVIN 3.2F	1.2–1.9 pt.	0.5–0.75	28	
zeta-cypermethrin MUSTANG MAX 0.8EC	1.28–4 oz.	0.008–0.025	21	
FALL ARMYWORMS				
alpha-cypermethrin FASTAC 0.83EC	3.2–3.8 oz.	0.018–0.025	21	Treatment: <i>Pre-Bloom</i> —Prevent greater than 35-percent leaf loss. <i>Pod Set to Maturity</i> —Prevent greater than 20-percent leaf loss.
bifenthrin BRIGADE 2EC DISCIPLINE 2EC	2.1–6.4 oz. 2.1–6.4 oz.	0.033–0.1 0.033–0.1	18 18	
chlorantraniliprole PREVATHON 0.43	14–20 oz.	0.047–0.067	1	
chlorpyrifos LORSBAN 4EC	1–1.5 pt.	0.5–0.75	28	
indoxacarb STEWARD 1.25 SC	9.2 oz.	0.09	14	

Table 2. Soybean Insect Control (cont.)

Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
FALL ARMYWORMS (cont.)				
gamma-cyhalothrin PROLEX	1.28–1.54 fl.oz.	0.0125–0.015	30	For control of first and second instars only.
lambda-cyhalothrin KARATE Z 2.08CS	1.6–1.92 oz.	0.025–0.03	30	
methomyl LANNATE 2.4LV LANNATE 90SP	1.5 pt. 0.5 lb.	0.45 0.45	14 14	
methoxyfenozide INTREPID 2F	4–8 oz.	0.06–0.12	14	
methoxyfenozide + spinetoram INTREPID EDGE	4–6.4 oz.	0.093–0.15	28	
spinosad BLACKHAWK	1.7–2.2 oz.	0.038–0.0495	28	
thiodicarb LARVIN 3.2F	1 pt.	0.4	28	
zeta-cypermethrin MUSTANG MAX 0.8EC	3.2–4 oz.	0.02–0.025	21	
GRASSHOPPERS				
acephate ORTHENE 90S ORTHENE 97 Other brand names (See label.)	0.56 0.5 lb.	0.5 0.485	14 14	Treatment: <i>Seedling</i> —Treat when stands are threatened. <i>Pre-Bloom</i> —Prevent greater than 35-percent leaf loss. <i>Pod Set to Maturity</i> —Prevent greater than 20-percent leaf loss.
alpha-cypermethrin FASTAC 0.83	3.2–3.8 oz.	0.018–0.025	21	
beta-cyfluthrin BAYTHROID XL 1EC	2.0–2.8 oz.	0.017–0.02	45	
bifenthrin BRIGADE 2EC DISCIPLINE 2EC	2.1–6.4 oz. 2.1–6.4 oz.	0.033–0.1 0.033–0.1	18 18	
diflubenzuron DIMILIN 2L	2 oz.	0.03	21	Dimilin and Diamond are both insect growth regulators and are only effective against immature grasshoppers.

Table 2. Soybean Insect Control (cont.)

Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
GRASSHOPPERS (cont.)				
gamma-cyhalothrin PROLEX 1.25	1.28–1.54 fl.oz.	0.0125–0.015	30	
lambda-cyhalothrin KARATE Z 2.08 CS	1.6–1.92 oz.	0.025–0.03	30	
novaluron DIAMOND 0.83 EC	9–12 oz.	0.058–0.078	30	
zeta-cypermethrin MUSTANG MAX 0.8EC	3.2–4 oz.	0.02–0.025	21	
KUDZU BUG				
acephate ORTHENE 97	0.75–1 lb.	0.73–0.97	14	<p>Treatment: <i>Prior to First Bloom</i>—Five kudzu bugs per plant across entire field. Do not bias all sampling to border rows where populations build initially. <i>First Bloom through R6</i>—Ten adults per sweep or one nymph per sweep. Also treat when immature kudzu bugs are easily and repeatedly found on petioles and main stems during visual inspections of the canopy. See Table 1 for more information.</p>
bifenthrin BRIGADE 2EC	5.12–6.4 fl.oz.	0.08–0.1	18	
DISCIPLINE 2EC	6.4 fl.oz.	0.1	18	
FANFARE 2EC	6.4 fl.oz.	0.1	18	
clothianidin BELAY 2.13	3–4 fl.oz.	0.05–0.067	21	
gamma-cyhalothrin DECLARE 1.25	1.28–1.54 fl.oz.	0.0125–0.015	30	
lambda-cyhalothrin KARATE ZEON 2.08	1.92 fl.oz.	0.03	45	
SILENCER 1EC	3.2 fl.oz.	0.025	30	
zeta-cypermethrin MUSTANG MAX 0.8EC	4 fl.oz.	0.025	21	
LESSER CORNSTALK BORERS				
chlorpyrifos LORSBAN 4EC	1–4 pt.	0.5–2	28	Treat when pests or damage is noted and stands are threatened.
MEXICAN BEAN BEETLES, BEAN LEAF BEETLES				
acephate ORTHENE 97	0.75–1 lb.	0.73–0.97	14	<p>Treatment: <i>Pre-Bloom</i>—Prevent greater than 35-percent leaf loss. <i>Pod Set to Maturity</i>—Prevent greater than 20-percent leaf loss.</p>
alpha-cypermethrin FASTAC 0.83EC	2.8–3.8 oz.	0.018–0.025	21	
beta-cyfluthrin BAYTHROID XL 1EC	1.6–2.8 oz.	0.013–0.02	45	
bifenthrin BRIGADE 2EC	2.1–6.4 oz.	0.033–0.1	18	
DISCIPLINE 2EC	2.1–6.4 oz.	0.033–0.1	18	

Table 2. Soybean Insect Control (cont.)

Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
MEXICAN BEAN BEETLES, BEAN LEAF BEETLES (cont.)				
carbaryl SEVIN 4F, XLR	1–2 pt.	0.5–1.0	21	
chlorpyrifos LORSBAN 4EC	1–1.5 pt.	0.5–0.75	28	
esfenvalerate ASANA 0.66EC	5.8–9.6 fl.oz.	0.03–0.05	21	
gamma-cyhalothrin PROLEX	0.77–1.28 fl.oz.	0.0075–0.0125	45	
lambda-cyhalothrin KARATE Z 2.08 CS	0.96–1.6 oz.	0.015–0.025	30	
methomyl LANNATE 2.4LV LANNATE 90SP	0.75 pt. 0.25 lb.	0.22 0.22	14 14	Treatment: <i>Pre-Bloom</i> —Prevent greater than 35-percent leaf loss. <i>Pod Set to Maturity</i> —Prevent greater than 20-percent leaf loss.
permethrin AMBUSH 2EC POUNCE 3.2EC	3.2–6.4 oz. 2–4 oz.	0.05–0.1 0.05–0.1	60 60	
zeta-cypermethrin MUSTANG MAX 0.8EC	2.8–4 oz.	0.0175–0.025	21	
PODWORMS (BOLLWORMS, CORN EARWORMS)				
alpha-cypermethrin FASTAC 0.83EC	2.8–3.8 oz.	0.018–0.025	21	
beta-cyfluthrin BAYTHROID XL 1EC	1.6–2.8 oz.	0.013–0.02	45	
bifenthrin BRIGADE 2EC DISCIPLINE 2EC	2.1–6.4 oz. 2.1–6.4 oz.	0.033–0.1 0.033–0.1	18 18	
carbaryl SEVIN 4F, XLR, PLUS	1–1.5 qt.	1–1.5	0	
chlorantraniliprole PREVATHON 0.43	14–20 oz.	0.047–0.067	1	
esfenvalerate ASANA 0.66EC	5.8 oz.	0.03	21	

Table 2. Soybean Insect Control (cont.)

Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
PODWORMS (BOLLWORMS, CORN EARWORMS) (cont.)				
gamma-cyhalothrin PROLEX	0.77–1.28 fl.oz.	0.0075–0.0125	45	
indoxacarb STEWARD 1.25SC	9.2 oz.	0.09	14	
lambda-cyhalothrin KARATE Z 2.08 CS	0.96–1.6 oz.	0.015–0.025	30	
methomyl LANNATE 2.4LV LANNATE 90SP	1.5 pt. 0.5 lb.	0.45 0.45	14 14	
methoxyfenozide + spinetoram INTREPID EDGE	4–6.4 oz.	0.093–0.15	28	
permethrin AMBUSH 2EC POUNCE 3.2EC	6.4 oz. 4 oz.	0.1 0.1	60 60	
spinosad BLACKHAWK TRACER 4SC	1.7-2.2 oz. 1.5-2 oz.	0.038-0.0495 0.047-0.062	28 28	
thiodicarb LARVIN 3.2F	10-24 oz.	0.25-0.6	28	
zeta-cypermethrin MUSTANG MAX 0.8EC	2.8-4 oz.	0.0175-0.025	21	
SOYBEAN LOOPERS				
chlorantraniliprole PREVATHON 0.43	14-20 oz.	0.047-0.067	1	
indoxacarb STEWARD 1.25 SC	6.7 oz.	0.065	14	
methoxyfenozide INTREPID 2F	4-8 oz	0.06-0.12	14	
methoxyfenozide + spinetoram INTREPID EDGE	4–6.4 oz.	0.093–0.15	28	
spinosad BLACKHAWK	1.1–2.2 oz.	0.025–0.0495	28	

Table 2. Soybean Insect Control (cont.)

Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
STINK BUGS - GREEN, SOUTHERN GREEN, BROWN, AND BROWN MARMORATED				
acephate ORTHENE 90S ORTHENE 97 Other brand names (See label.)	0.8–1.1 lb. 0.75–1 lb.	0.72–1.0 0.73–0.97	14 14	Treat between bloom and mid-podfill when stink bugs average one per three feet of row or two per 15 sweeps. After mid-podfill until pod maturity, treat when stink bugs average one per rows foot or three per 15 sweeps.
alpha-cypermethrin FASTAC 0.83	3.2–3.8 oz.	0.018–0.025	21	
beta-cyfluthrin BAYTHROID XL 1EC	1.6–2.8 oz.	0.013–0.02	45	
bifenthrin BRIGADE 2EC DISCIPLINE 2EC	2.1–6.4 oz. 2.1–6.4 oz.	0.033–0.1 0.033–0.1	18 18	
carbaryl SEVIN 4F, XLR	1–1.5 qt.	1–1.5	0	
clothianidin BELAY 23.6% SC	3–4 oz.	0.05–0.067	21	
gamma-cyhalothrin PROLEX	1.28–1.54 fl.oz..	0.0125–0.015	45	
lambda-cyhalothrin KARATE Z 2.08 CS	1.6–1.92 oz.	0.025–0.03	30	
zeta-cypermethrin MUSTANG MAX 0.8EC	3.2–4 oz.	0.02–0.025	21	
STINK BUGS - REDBANDED				
acephate ORTHENE 905 ORTHENE 97	0.83–1.1 lb. 0.77–1.0 lb.	0.75–1 lb. 0.75–1 lb.	14 14	Treat from bloom until pod maturity when stink bugs average one per three row feet or two per 15 sweeps.
bifenthrin BRIGADE 2 EC DISCIPLINE 2 EC	6.4 oz. 6.4 oz.	0.1 0.1	18 18	
beta-cyfluthrin + imidacloprid LEVERAGE 360	2.8 oz.	0.066	21	
clothianidin BELAY 2.13 SC	4 oz.	0.066	21	
thiamethoxam + lambda-cyhalothrin ENDIGO 2.06 ZC	4.0–4.5 oz.	0.064–0.072	30	

Table 2. Soybean Insect Control (cont.)

Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
THREE-CORNERED ALFALFA HOPPERS				
acephate ORTHENE 97 Other brand names (See label.)	0.75–1 lb.	0.73–0.97	14	For soybeans less than 10 inches tall, treat when pests or damage is noted and stands are threatened. Once soybeans become 10 inches tall, treat three-corner alfalfa hoppers when you catch an average of two hoppers per sweep.
alpha-cypermethrin FASTAC 0.83	2.8–3.8 oz.	0.018–0.025	21	
beta-cyfluthrin BAYTHROID XL 1EC	1.6–2.8 oz.	0.013–0.02	45	
carbaryl SEVIN 4F, XLR PLUS	1 qt.	1	21	
gamma-cyhalothrin PROLEX	0.77–1.28 oz.	0.0075–0.0125	45	
lambda-cyhalothrin KARATE Z 2.08 CS	0.96–1.6 oz.	0.015–0.025	30	
zeta-cypermethrin MUSTANG MAX 0.8EC	2.8–4 oz.	0.0175–0.025	21	
VELVETBEAN CATERPILLARS, GREEN CLOVERWORMS				
acephate ORTHENE 97	0.75–1 lb.	0.73–0.97	14	Treatment: Pre-Bloom —Prevent greater than 35-percent leaf loss. Pod Set to Maturity —Prevent greater than 20-percent leaf loss by treating when five to eight soybean loopers or velvetbean caterpillar larvae, 0.25 inch or larger, are present per foot of row. Each larva consumes a high percentage of its total foliage during the last 4 to 5 days of its larval cycle.
alpha-cypermethrin FASTAC 0.83	2.8–3.8 oz.	0.018–0.025	21	
<i>Bacillus thuringiensis</i> * DIPEL ES KETCH DF	Use label rates.		0	
beta-cyfluthrin BAYTHROID XL 1EC	1.6–2.8 oz.	0.013–0.02	45	
bifenthrin BRIGADE 2EC	2.1–6.4 oz.	0.033–0.1 oz.	18	
carbaryl SEVIN 4F, XLR PLUS	1 pt.	0.5	21	
chlorantraniliprole PREVATHON 0.43	14–20 oz.	0.047–0.067	1	
chlorpyrifos LORSBAN 4EC	0.5–1 lb.	0.3–0.5	28	
diflubenzuron DIMILIN, 2L	2–4 oz.	0.03–0.06	21	

Table 2. Soybean Insect Control

Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
VELVETBEAN CATERpillARS, GREEN CLOVERWORMS (cont.)				
esfenvalerate ASANA 0.66EC	0.85 oz.	0.0125	21	
gamma-cyhalothrin PROLEX	0.77–1.28 fl.oz.	0.0075–0.0125	45	
lambda-cyhalothrin KARATE Z 2.08 CS	0.96–1.6 oz.	0.015–0.025	30	
methomyl LANNATE 2.4LV LANNATE 90SP	0.75 pt. 0.2 lb.	0.22 0.22	14 14	
methoxyfenozide INTREPID 2F	4–8 oz.	0.06–0.12	14	
methoxyfenozide + spinetoram INTREPID EDGE	4–6.4 oz.	0.093–0.15 oz.	28	
novaluron DIAMOND 0.83 EC	6–10 oz.	0.039–0.065	30	
permethrin AMBUSH 2EC POUNCE 3.2EC	3.2 oz. 2 oz.	0.5 0.5	60 60	
spinosad BLACKHAWK	1.1–2.2 oz.	0.025–0.0495	28	
thiodicarb LARVIN 3.2F	10 oz.	0.25	28	
zeta-cypermethrin MUSTANG MAX 0.8EC	2.8–4 oz.	0.0175–0.025	21	

Table 3. Multiple Soybean Pests—Premixed, or Copackaged Products

Product	Product/acre ¹	Lb. Active Ingredient per Acre	PHI	Comment
imidacloprid/beta-cyfluthrin (R) LEVERAGE 360	2.8	0.065	14 d	Premixed
thiamethoxam/lambda-cyhalothrin (R) ENDIGO 2.06 ZC	2.5–4.5 oz.	0.04–0.072	30 d	Premixed
imidacloprid/bifenthrin (R) BRIGADIER 2 SC	5.1–6.1 oz.	0.08–0.095	18 or 45 d	Premixed
spinosad/gamma-cyhalothrin (R) CONSERO	1 unit per 32–64 acres	0.164–0.328	45 d	Copack
chlorantraniliprole/lambda-cyhalothrin (R) BESIEGE 1.25 ZC	5.0–10.0 oz.	0.049–0.098	30 d	Premixed
chlorpyrifos/gamma-cyhalothrin (R) COBALT 2.55	7.0–38.0 oz.	0.139–0.757	30 d	Premixed
chlorpyrifos/lambda-cyhalothrin (R) COBALT ADVANCED 2.63	6.0–38.0 oz.	0.123–0.78	30 d	Premixed
diflubenzuron/lambda-cyhalothrin (R) DOUBLE TAKE 3	2.0–4.0 oz.	0.047–0.0938	30 d	Premixed
methoxyfenozide/spinetoram (R) INTREPID EDGE	4.0–6.4	0.094–0.15	28 d	Premixed

ai = active ingredient; (R) = restricted use; PHI = preharvest interval

¹ Rate varies with different pests.

Table 4. Properties of Insecticides and Acaricides Used on Soybeans that May Affect Water Quality

Common Name	Trade Name	Surface-Loss Potential ¹	Leaching Potential ²
<i>Bacillus thuringiensis</i>	Dipel, Ketch	*	*
beta-cyfluthrin	Baythroid XL	Large	Small
bifenthrin	Brigade, Discipline, Fanfare	Large	Small
carbaryl	Ortho, Sevimol, Sevin	Medium	Small
chlorpyrifos	Dursban, Lorsban	Medium	Small
dicrotophos	Bidrin	Small	Medium
diflubenzuron	Dimilin	Large	*
esfenvalerate	Asana	Large	Small
indoxacarb	Steward	Small	Small
gamma-cyhalothrin	Declare, Prolex	Large	Small
lambda-cyhalothrin	Karate Z, Silencer	Large	Small
malathion	Cythion, Malathion	Small	Small
methomyl	Lannate	Small	Medium
methoxyfenozide	Intrepid	Large	Medium
permethrin	Ambush, Pounce	Large	Small
spinosad	Blackhawk, Tracer	Small	Small
thiodicarb	Larvin	Medium	N/A
zeta-cypermethrin	Mustang Max	Large	Small

¹ The surface-loss potential indicates the tendency of the pesticide to move with sediment in runoff.

² The leaching potential indicates the tendency of the pesticide to move in solution with water and to leach below the root zone.

NA = Information not available.

* = Pesticide should not leach with percolating water.

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DISEASE AND NEMATODE CONTROL

Seed and Seedling Diseases

Seed and seedling diseases are caused by pathogenic fungi, but the extent of the damage is determined by seed quality and soil conditions. To reduce the risk of these diseases this spring, follow these suggestions.

- **Use “Certified Seed” or high quality, vigorous seed** sold by a reliable dealer. This is one of the most important factors in obtaining good stands.
- **Plant on a good seedbed.** A well-prepared seedbed is important for good germination and seedling emergence.
- **Avoid planting on low, poorly drained soils.** These soils slow seed germination and seedling growth, making them more susceptible to attack by seed and soil-borne fungi.
- **Avoid planting too deep.** Optimum planting depth for soybeans in Alabama is 1 to 1.5 inches.
- **Rotate soybeans with non-leguminous crops** such as cotton, corn, sorghum, and small grains to avoid buildup of soil-borne fungi, nematodes, insects, and weeds, which can reduce yields.
- **Treat seed with a fungicide.** Seed treatment is beneficial in controlling seedling diseases and is especially effective in improving seed germination and seedling vigor in seeds of poor quality. Since complete seed coverage is necessary for best results, commercially applied seed treatments are preferred. Hopper-box treatments are generally not as effective because the fungicide is poorly distributed. However, farmers who take extra precautions to see that the fungicide is evenly distributed in hopper boxes can benefit from the treatment. Remember, no fungicide is effective unless it comes in contact with the disease organism. (Tables 5 and 6).

Fungicide Resistance Management in Soybean*

Development of resistance in fungi to fungicides is a concern for the worldwide agricultural industry. Fungicide resistance can occur when a selection pressure is placed on the fungal pathogen population. Fungicides that have a single site of action tend to be more at risk for developing resistance compared to those that have multi-site activity. For example in recent years the fungal pathogen that causes frog-eye leaf spot of soybean has been shown to be resistant to the Qol strobilurin (FRAC group 11) class of fungicides in some counties in Alabama.

An organization known as the Fungicide Resistance Action Committee (FRAC) was developed to address the issue of fungicide resistance. This organization developed a code of numbers and letters that can be used to distinguish the different fungicide groups based on their mode of action (Table 6). This code is known as the FRAC Code and is now included on fungicide labels. A fungus that becomes resistant to a specific fungicide may be resistant to many or all of the fungicides within that fungicide’s FRAC Code, a phenomenon referred to as *cross-resistance*. More information is available at the FRAC website: www.frac.info

Fungicide resistance management is important in the production of soybean and all crops. You will reduce the risk of a fungal pathogen developing resistance to a fungicide by taking the following steps:

- Apply a fungicide only when it is necessary.
- Alternate fungicides that have different modes of action.
- Apply mixtures of fungicides with different modes of action.
- Follow the directions on the label. Use recommended rates and obey restrictions.
- Monitor for reduced fungicide efficiency in your field.

*The majority of this information was obtained from the *Fungicide Manual for Soybean Rust*, Dorance, Draper and Hershman, 2007.

Table 5. Fungicide Efficacy for Control of Soybean Seedling Diseases¹

Fungicide Active Ingredient	<i>Pythium</i> sp. ²	Phytophthora Root Rot	<i>Rhizoctonia</i> sp.	<i>Fusarium</i> sp. ^{2,3}	Sudden Death Syndrome (SDS) (<i>Fusarium virguliforme</i>)	<i>Phomopsis</i> sp.
azoxystrobin	P-G	NS	VG	F-G	NR	P
carboxin	U	U	G	U	NR	U
chloroneb	U	P	E	P	NR	P
ethaboxam	E	E	U	U	U	U
fludioxonil	NR	NR	G	F-VG	NR	G
fluopyram	NR	NR	NR	NR	VG	NR
fluxapyroxad	U	U	E	G	NR	G
ipconazole	P	NR	F-G	F-E	NR	G
mefenoxam	E ⁴	E	NR	NR	NR	NR
metalaxyl	E ⁴	E	NR	NR	NR	NR
PCNB	NR	NR	G	U	NR	G
penflufen	NR	NR	G	G	NR	G
prothioconazole	NR	NR	G	G	NR	G
pyraclostrobin	P-G	NR	F	F	NR	G
sedaxane	NS	NS	E	NS	NR	G
thiabendazole	NS	NS	NS	NS	U	U
trifloxystrobin	P	P	F-E	F-G	NR	P-F

¹ Efficacy ratings: P=poor. F=fair. G=good. VG=very good. E=excellent. NR=not recommended. U=unknown efficacy or insufficient data to rank product.

² Products may vary in efficacy against different *Fusarium* and *Pythium* species.

³ Listed seed treatments do not have efficacy against *Fusarium virguliforme*, causal agent of sudden death syndrome.

⁴ Areas with *Pythium* populations that are insensitive to mefenoxam or metalaxyl may see less efficacy with these products.

Table 6. Common Fungicide Trade Names and Active Ingredients

Product/Trade Name	Active Ingredient
Acceleron®	DX-612 fluxapyroxad DX-309 metalaxyl DX-109 pyraclostrobin
Allegiance FL®	metalaxyl
Allegiance LS®	metalaxyl
Apron XL LS®	mefenoxam
ApronMaxx RFC®	fludioxonil mefenoxam
ApronMaxx RTA®	fludioxonil mefenoxam
Catapult XL®	chloroneb mefenoxam
CruiserMaxx®	fludioxonil mefenoxam
CruiserMaxx Advanced® or Cruiser Maxx Plus®	fludioxonil mefenoxam
CruiserMaxx Advanced Vibrance®	fludioxonil mefenoxam sedaxane
Dynasty®	azoxystrobin
EverGol Energy SB®	metalaxyl penflufen prothioconazole
ILeVO®	fluopyram
Inovate Pro®	ipconazole metalaxyl
Intego®	ethaboxam
Maxim 4FS®	fludioxonil
Mertect 340F®	thiabendazole

Product/Trade Name	Active Ingredient
Prevail®	carboxin metalaxyl PCNB
Trilex 2000®	metalaxyl trifloxystrobin
Vibrance®	sedaxane
Warden CX®	fludioxonil mefenoxam sedaxane
Warden RTA®	fludioxonil mefenoxam

Table 7. Fungicide Groups That Can be Applied on Soybean in the United States

FRAC Code	Chemical Group	Example	Risk of Fungicide Resistance
1	methyl benzimidazole carbamates (MBC)	Topsin M	High
3	demethylation inhibitors (DMI, includes triazoles)	Folicur	Medium
7	carboximides (i.e. fluxapyroxad in Priaxor)	Priaxor	Medium
11	quinone outside inhibitors (QoI, included strobilurins)	Headline	High
M	chloronitriles, inorganics	Bravo	Low

SOYBEAN RUST

Soybean rust is a disease caused by the fungus *Phakospora pachyrhiza*. The disease was first identified in the continental United States in 2004. Soybean rust produces lesions on infected plants that can lead to premature defoliation and reduced yields. Early diagnosis and treatment for the disease is crucial.

Symptoms begin on the lower leaves as small lesions that increase in size and change in color from gray to tan or reddish brown on the underside of the leaves. Under close examination, tiny bumps can be seen within the lesions. The bumps are spore-producing structures called *uredinia* that give the leaf a rusty appearance. The *uredinia* are primarily found on the underside of the leaf, though smaller *uredinia* may be found on the upper side. Once pod set begins, infection can spread rapidly to the middle and upper leaves of the plant. The spores of the fungus are called *urediniospores* and are transported by air currents to other soybean plants. Rust-infected leaves eventually turn yellow and fall off the plant. Premature defoliation and a reduction in the number of days to maturity will cause infected plants to have lower seed weight and fewer pods and seeds.

All commercial varieties of soybeans currently available are highly susceptible to soybean rust. Management of soybean rust will depend on early detection of the disease. Monitoring soybean fields is recommended throughout the growing season. Fungicides may reduce yield losses depending on the plant developmental stage, time when soybean rust is detected, and timing of fungicide applications.

Fungicide Use Guidelines for Soybean Rust

Several fungicides are available for use against soybean rust (see Table 6). These can be divided into three groups: strobilurins, triazoles, and premixes (or tank-mixes).

Strobilurins should be used as protectants and must be applied prior to infection to be effective. The products *Quadris* and *Headline* are strobilurins. Triazoles have protectant and curative activity and include the products *Alto*, *Domark*, *Folicur*, *Laredo*, *Orius*, *Proline*, *Tilt*, *TebuStar* and *Topguard*. Premixes of strobilurin and triazole materials include *Quilt*, *Quilt Xcel*, *Stratego YLD*, and *Quadris Xtra*. Growers also have the option of tank-mixing a strobilurin with a triazole on their own. *Priaxor* is a premix but should only be used as a protectant similar to the strobilurins.

When to spray. Your first spray should not be applied prior to bloom. Data suggest that applications prior to bloom are not economical. Make your first application when there is a risk of rust in your region. This disease can spread rapidly so growers need to be aware of new rust outbreaks in the southeastern United States. If growers wait for the disease to show up in their fields before applying a fungicide, chances are their fungicide program will not be as effective.

Growers can keep informed of rust movement by visiting the soybean rust ipmPIPE Website at <http://sbr.ipmpipe.org>.

Growers who follow rust movement closely could initially use a strobilurin fungicide such as *Headline* or *Quadris* in a protectant program (before the disease arrives in their area), then follow up with a triazole or a premix or a tank-mix

(triazole plus strobilurin) 21 days later if a second application is needed. In situations where the risk from soybean rust is relatively low, delaying your initial fungicide application until the R3-R4 growth stage may be most effective in managing other foliar diseases as well as protecting against rust infection later in the season.

If there is a likelihood that rust has moved into your field prior to your first fungicide application, applying a triazole fungicide would be the most effective option available. A second application of a premix may be needed in 14 to 21 days. Consecutive applications of either a triazole or strobilurin should be avoided due to resistance concerns. Refer to fungicide labels for specific directions and restrictions.

Spraying *after* the R5 growth stage is not recommended due to lack of yield response. In addition, many fungicides have preharvest intervals or growth stage restrictions. Refer to fungicide labels for specific directions and restrictions.

Fungicide Use Strategies for Soybean Rust*

Fungicide use strategy 1: low rust risk:

- No disease detected in immediate area or in sentinel plots; no rust forecasting alerts.
- Crop between R1 and R6.
- DO NOT SPRAY.
- Reevaluate at regular intervals through R6.

Fungicide use strategy 2: high rust risk, preventive program:

- High rust risk based on observations from regional sentinel plots and rust forecasting.

- Rust not detected in local soybean crop.
- Crop between R1 and R6.
- *Fungicide applications:*
 - 1) Premix (tank-mix) or strobilurin or triazole.
 - 2) Premix (tank-mix) or strobilurin¹ or triazole².

Fungicide use strategy 3: rust detected, curative program:

- Rust detected at low levels (1 to 10 percent of leaves in lower crop canopy) in your field or your neighbor's field.
- Crop between R1 and R6.
- *Fungicide applications:*
 - 1) Premix (tank-mix) or strobilurin + triazole or triazole.
 - 2) Premix (tank-mix) or triazole².

Fungicide use strategy 4: rust detected in mid-canopy:

- Crop between R1 and R6.
- Weather favorable for rust development.
- Crop may not respond to treatment; fungicide application may not be economical.
- Triazoles may provide some level of control.
- DO NOT apply a strobilurin.

*Information obtained from the *Fungicide Manual for Soybean Rust*, Dorance, Draper, and Hershman, 2007.

¹ If the first application was not a strobilurin

² If the first application was not a triazole

Table 8. Soybean Rust Fungicides

Fungicides	Active Ingredient	Rate/Acre	Chemical Class	FRAC Code	Spray Interval (days)	Preharvest Interval (days)
Alto	cyproconazole	4 fl.oz.	Triazole	3	14-28	30
Aproach	picoxystrobin	6-12 fl.oz.	Strobilurin	11	7-21	14
Aproach Prima	cyproconazole + picoxystrobin	5-6.8 fl.oz.	Strobilurin + Triazole	3 + 11	14-28	14
Bravo WeatherStik	chlorothalonil	16-36 fl.oz.	Benzonitrile	M	14	42
Bumper	propiconazole	4-6 fl.oz.	Triazole	3	14	Not after R5 growth stage
Domark 230ME	tetraconazole	4-6 fl.oz.	Triazole	3	14-21	Not after R5 growth stage
Echo 720	chlorothalonil	16-40 fl.oz.	Benzonitrile	M	14	42
Equus 720 SST	chlorothalonil	1-2.5 pt.	Benzonitrile	M	14	42
Folicur	tebuconazole	3-4 fl.oz.	Triazole	3	14	21
Headline EC	pyraclostrobin	6-12 fl.oz.	Strobilurin	11	7-21	21
Headline SC	pyraclostrobin	6-12 fl.oz.	Strobilurin	11	7-21	21
Laredo EC	myclobutanil	4-8 fl.oz.	Triazole	3	10-14	28
Monsoon	tebuconazole	3-4 oz.	Triazole	3	14	21
Priaxor	fluxapyroxad + pyraclostrobin	4-8 fl.oz.	(SDH) inhibitor + Strobilurin	7 + 11	7-14	21
Priaxor D	pyraclostrobin + fluxapyroxad + tetraconazole	4 oz.	Strobilurin + (SDH) inhibitor + Triazole	11 + 7 + 3	14-21	21
Proline	prothioconazole	2.5-3 fl.oz.	Triazole	3	10-21	30
Orius	tebuconazole	3-4 fl.oz.	Triazole	3	10-14	21
Quadris	azoxystrobin	6.2-15.4 fl.oz.	Strobilurin	11	7-21	14
Quadris Top SBX	azoxystrobin + difenconazole	7-7.5 fl.oz.	Strobilurin + Triazole	11 + 3	7-10	14

Table 8. Soybean Rust Fungicides (cont.)

Fungicides	Active Ingredient	Rate/Acre	Chemical Class	FRAC Code	Spray Interval (days)	Preharvest Interval (days)
Quadris Xtra	azoxystrobin + cyproconazole	4 fl.oz.	Strobilurin + Triazole	11 + 3	14-28	30
Quilt	azoxystrobin + propiconazole	14-20 fl.oz.	Triazole + Strobilurin	11 + 3	14-21	21
Quilt Xcel	propiconazole + azoxystrobin	14-21 fl.oz.	Triazole + Strobilurin	11 + 3	14-21	up to R6
Stratego	propiconazole + trifloxystrobin	5.5-10 fl.oz.	Triazole + Strobilurin	11 + 3	10-21	21
Stratego YLD	prothioconazole + trifloxystrobin	4-4.6 fl.oz.	Triazole + Strobilurin	11 + 3	10-21	21
TebuStar	tebuconazole	3-4 fl.oz.	Triazole	3	14	21
Tilt	propiconazole	4-8 fl.oz.	Triazole	3	14	Not after R5 growth stage
Topguard	flutriafol	7 fl.oz.	Triazole	3	21-35	21
Topsin XTR	thiophanate-methyl + tebuconazole	16-20 oz.	Benzimidazole + Triazole	M	14	See comments in Table 6

OTHER MAJOR POD AND STEM DISEASES

Other major pod and stem diseases that attack soybeans in Alabama include brown spot (*Septoria glycines*), pod and stem blight (*Diaporthe phaseolorum*), frog-eye leaf spot (*Cercospora sojina*), anthracnose (*Collectotrichum dematium* var. *truncata*), downy mildew (*Peronospora manshurica*), purple stain (*Cercospora kukuchii*), and aerial blight (*Rhizoctonia solani*).

Control measures, including disease-free seed treated with a fungicide and a 2- to 3-year crop rotation with non-leguminous crops, will help reduce pod and stem diseases.

Foliar fungicides can produce a profitable yield increase in soybean fields that have a good yield potential and are subjected to conditions favoring disease development. Soybeans exposed to periods of rainy weather or heavy dews during bloom to early pod set have the highest incidence of foliar, pod, and stem diseases. Fungicides applied to soybeans during this developmental stage or just after the occurrence of these wet periods produce the best results.

Current Recommendations for Foliar Fungicides

1. Apply fungicides only to soybean fields that have a potential yield exceeding 25 bushels per acre or to fields where seed beans are produced.

2. Make first application to soybeans that are in mid-bloom to early-pod-set stages and that have been exposed to 2 to 3 days of rain or heavy dew. Do not apply less than 5 gallons of water per acre for aerial applications and no less than 20 gallons of water per acre for ground applications. Make a second application 2 weeks later. However, if dry weather prevails during the 2-week period following the first application, omit the second application.

Stem canker (*Diaporthe phaseolorum* f. sp. *meridionalis*) is a destructive fungal disease of soybeans that has become widespread throughout most of the state. The degree of damage depends on the stage of plant growth when infection occurs, the soybean cultivar, crop stress, and the climatic conditions. Severely infected fields may be completely wiped out. Slightly infected fields, on the other hand, may suffer little or no yield loss.

Stem canker is believed to spread from one region to another by means of infected seeds or contaminated equipment. Once the disease is introduced into an area, it spreads from field to field on farm equipment and windblown rain.

The first noticeable signs of stem canker occur on soybeans during pod fill. At this stage, many of the plants may be dead but still erect with dead leaves attached.

The main stem of the infected plant usually has large, reddish brown lesions located at the base of a petiole or on the lower node. Each lesion is surrounded by green tissue. The pith or the central portion of the main stem tissue is brown or dead several inches above and below the lesion. The leaves on a recently infected plant exhibit a distinctive yellowing and, later, browning between the veins.

Suggested practices to help control stem canker are:

1. Avoid replanting soybeans in fields infested with stem canker whenever possible. Plant a non-host crop (any non-leguminous crop) for at least 2 years.
2. Do not use soybeans for seed which have been harvested from stem-canker infested fields.
3. Treat seeds with Vitavax or a similar fungicide that contains carboxin and thiram.
4. Delay planting date until the end of the recommended planting period. Research indicates that later-maturing cultivars suffer less from stem canker injury when planted late. According to research at Auburn University, late-maturing cultivars suffered little injury when planted on or after June 15 in fields infested with stem canker in Central Alabama; however, late planting can result in yield losses due to dry weather and heat stress.
5. If stem-canker fields must be replanted in soybeans the following year, plant a cultivar that has shown some tolerance to the disease. Most seed companies have literature ranking tolerance of their varieties.

Table 9. Soybean Pod and Stem Disease Control

Disease	Fungicide and Formulation	Amount of Formulation per 100 Lb. of Seed	Comments
AERIAL BLIGHT, ALTERNARIA LEAF SPOT, BROWN SPOT, CERCOSPORA BLIGHT AND LEAF SPOT, FROGEYE LEAF SPOT, RUST, SOUTHERN BLIGHT			
azoxystrobin QUADRIIS 2.08F HEADLINE EC HEADLINE SC		6.2-15.4 oz. 6-12 oz. 6-12 oz.	Applications should begin prior to disease development. Use higher rates under conditions favorable for severe disease development. A non-ionic surfactant is recommended with lower use rates with Quadris. DO NOT make more than one application before alternating to a fungicide with a different mode of action.
AERIAL BLIGHT, ANTHRACNOSE, BROWN SPOT, FROGEYE LEAF SPOT, PURPLE SEED STAIN (CERCOSPORA), POD AND STEM BLIGHT (DIAPORTHE, PHOMOPSIS)			
thiophanate-methyl TOPSIN M 70WP TOPSIN M WSB TOPSIN XTR		0.5-1 lb. 0.5-1 lb. 16-20 oz.	Apply from full bloom to when pods are 0.125- to 0.25-inch long. Make a second application 14- to 21-days later. DO NOT make the second application later than 14 days after pods average 0.25 inch in length or when beans form in pods. Use the high rate under severe disease pressure. DO NOT make more than two applications per year.
ANTHRACNOSE, CERCOSPORA LEAF BLIGHT, FROGEYE LEAF SPOT, POD AND STEM BLIGHT (DIAPORTHE, PHOMOPSIS), PURPLE SEED STAIN, RUST			
chlorothalonil BRAVO ULTREX			Apply in sufficient water to obtain full coverage, using at least 5 gallons of water per acre for aerial application. Use the three-application program in areas having a history of moderate to severe disease intensity. DO NOT exceed three applications per season. DO NOT apply within 6 weeks of harvest.
		<i>Two-Application Program:</i> 1.4-2.2 lb.	<i>Two-Application Program:</i> Make first application when a majority of pods are 0.125 to 0.75 inch in length and the second at the beginning of seed formation (about 14 days later).
		<i>Three-Application Program:</i> 0.9-1.4 lb	<i>Three-Application Program:</i> Make first application at the beginning of flowering, the second when the majority of pods are 0.125 to 0.75 inch in length, and the third at the beginning of seed formation.
ECHO 720 EQUUS 720 SST		See label. See label.	

NEMATODES

The most important nematode species that attack soybeans in Alabama are soybean cyst, root-knot, lance, reniform, and lesion. Fields should be sampled for nematodes every 2 to 3 years unless problem areas develop. Recommended sampling period is from August through October. Contact your county Extension System office for information sheets and shipping cartons. Mail samples to Plant Diagnostic Laboratory, ALFA Services Building, 961 South Donahue Drive, Auburn University, AL 36849-5624. A \$10.00 fee is required for each sample.

Chemical Control

Nematicides applied to seed or used in-furrow can reduce early-season root infection by nematodes, but do not provide season-long control and may not be economical. Nematicides can be effective in controlling soybean cyst nematode (SCN) populations in infested fields but will not replace the use of resistant varieties and crop rotation as primary management practices for nematode infestations. Nematode control products that can be applied in combination with fungicide/insecticide seed treatments include the following:

Votivo (*Bacillus firmus*) is a biological seed treatment that provides early-season protection against neamtodes. Poncho/Votivo is a combination insecticide (clothianidin) /nematicide that is applied to the seed prior to planting.

Avicta Complete Beans is a seed treatment product that combines a nematicide (Avicta 500FS—abamectin) with a fungicide (Apron Maxx) and/or insecticide (Cruiser 5FS), or CruiserMaxx premix.

Clariva Complete Beans nematicide (Clariva pn)/insecticide/fungicide seed treatment is an on-seed application of separately registered products that has the added nematicide component for control of SCN.

Cultural Control: Soybean Cyst Nematode (SCN)

Control SCN by using non-host crops and resistant soybean cultivars. SCN will attack and multiply on relatively few plant species (Table 10).

Several non-host crops can be used in a rotation system to control SCN (Table 10). In fields with moderate to high cyst populations, follow a 3- or 4-year rotation using non-host crops and resistant cultivars.

At the end of this period, a nematode analysis should be made. If the SCN population is low, plant a susceptible cultivar for 1 year; then, repeat the rotation. When rotating with non-host crops or resistant soybean cultivars, an effective weed control program is necessary because SCN can survive and multiply on several weed species (Table 10).

Cultural Control: Root-Knot Nematodes

Crop Rotation with Non-Host Crops. Several root-knot (*Meloidogyne*) species attack and severely damage soybeans

in Alabama. Southern root-knot (*M. incognita*) and peanut root-knot (*M. arenaria*) are the two most common and are responsible for most nematode damage on soybeans.

Root-knot species have a wide host range, but some non-host crops can be used effectively in a crop rotation scheme to reduce populations. Grain sorghum, coastal bermuda, and some cultivars of pearl millet are considered good rotation crops. Cotton, although susceptible to southern root-knot races three and four, is an effective rotation crop in fields with southern root-knot races one and two or in fields with peanut root-knot.

Since root-knot species and race determinations cannot be made in the state nematology laboratory, growers will have to determine by trial and error which non-host crops are best suited for their root-knot infested fields.

Root-Knot Resistant Cultivars. Several soybean cultivars have claimed root-knot resistance. However, some appear to be losing this resistance in certain areas of the state, particularly in

South Alabama. Growers should, therefore, carefully observe the performance of these root-knot resistant cultivars if they are grown in fields with severe root-knot infestations.

Soybean Cyst Nematode (SCN) Resistant Varieties. Using resistant varieties is very effective for managing SCN. The most important characteristic of SCN-resistant varieties is yield potential in SCN-infested fields. Yield performance of these varieties in non-infested fields can vary greatly. SCN races 2, 4, 5, 6, and 14 have been identified in Alabama.

Table 10. Soybean Cyst Nematode (*Heterodera glycines*) Hosts

Host Crops*	Weed Hosts	Non-Host Crops
Soybeans, Snap Beans, Lima Beans Crimson Clover, Cowpeas Common Lespedeza, Hairy Lespedeza Korean Lespedeza, Sericea Lespedeza Common Vetch, Hairy Vetch	Chickweed, Coffee Bean Hemp Sesbania, Henbit Deadnettle Lowhop Clover, Mullein Pokeweed, Sicklepod	Corn, Cotton, Peanuts, Grain Sorghum Oats, Wheat, Fescue, Rye

* List prepared by Dr. Ralph Motsinger, Georgia Cooperative Extension Service.

Table 11. Properties of Fungicides and Nematicides Used on Soybeans That May Affect Water Quality

Common Name	Trade Name	Surface-Loss Potential ¹	Leaching Potential ²
captan	Captan	NA	NA
carboxin	Vitavax	Small	Small
metalaxyl	Apron	Small	Medium
PCNB	Terraclor	Large	Small
thiobendazole	Mertect	NA	NA
thiophanate-methyl	Topsin	Small	Medium
thiram	Thiram	Medium	Medium

¹The surface-loss potential indicates the tendency of the pesticide to move with sediment in runoff.

²The leaching potential indicates the tendency of the pesticide to move in solution with water and to leach below the root zone.

NA = Information not available.

Disease and Nematode Control section prepared by Edward J. Sikora, Extension Plant Pathologist, Professor, Department of Entomology and Plant Pathology, Auburn University; Kathy S. Lawrence, Plant Pathologist, Associate Professor, Department of Entomology and Plant Pathology, Auburn University; and Dennis Delaney, Extension Specialist, Alabama Cooperative Extension System, Alabama A&M University and Auburn University. Some recommendations are based on research conducted in other states.

WEED CONTROL

Table 12. Soybean Weed Control

Herbicide (trade name)	Herbicide (common name)	REI/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
BURNDOWN FOR MINIMUM TILL, STRIP-TILL, OR NO-TILL SOYBEANS								
Afforia	flumioxazin + thifensulfuron-methyl + tribenuron-methyl	12 hr./	2.5–3.75 oz.	0.31–0.46 lb.	2 + 14	Apply preplant or preemergence within 3 days after planting but before soybean emerges.	Broadleaf, partial control of nutsedge and annual grasses.	Plant at least 1.5 inches deep, completely covering the seed. Residual control requires rainfall. Do not apply within 100 ft of cotton crops. See label for additional restrictions. Crop response may occur if applied with organophosphates. Use a COC at 1% v/v or an NIS at 0.25% v/v.
Clarity, Sterling Blue, Vision, others	dicamba	24 hr./7 d	4–16 fl.oz.	0.125–0.5 lb.	4	Apply prior to planting soybeans either 14 or 28 days depending on the rate used (see comments).	Annual and biennial broadleaf weeds	See label for tank-mix options and spray drift management control. Add a nonionic surfactant (NIS) at 1 pint per 100 gallons of water. Soybeans can be planted in 14 days for 8 fluid ounces or less, and 28 days for 16 fluid ounces per acre and a minimum accumulation of 1 inch rainfall or overhead irrigation.
ET	pyraflufen-ethyl	412 hr./90 d	0.5–2.0 fl. oz.	0.00081–0.00325 lb.	14	Apply preplant burndown and after planting, before emergence.	Broadleaf weeds	Apply in a minimum of 10 gallons of water per acre. A COC is recommended at 1%–2% v/v. Allow a minimum of 30 days between applications.
Gramoxone SL, Firestorm/Parazone	paraquat	24 hr./R3 stage	2–4 pt. (2 lb./gal.) 1.3–2.6 pt. (3 lb./gal.)	0.5–1.0 lb.	22	Apply as preplant burndown or prior to crop emergence.	Annual grasses and broadleaf weeds.	Use the 2.0–2.5 pt. rate for weeds 1–3 inches; 2.5–3.0 pt. rate for weeds 3–6 inches; 3.0–4.0 pt. rate for weeds 6 inches tall. See label for tank-mix partners for improved burndown or residual control. Use in a minimum of 10 gallons of spray per acre for ground applications. Add a nonionic surfactant at 0.5% v/v or a crop oil concentrate at 1% v/v.

Table 12. Soybean Weed Control (cont.)

Herbicide (trade name)	Herbicide (common name)	REI/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
BURNDOWN FOR MINIMUM TILL, STRIP-TILL, OR NO-TILL SOYBEANS (cont.)								
Leadoff	rimsulfuron + thifensulfuron- methyl	4 hr./30 d	1.5–2.7 oz.	0.0313– 0.0564 lb.	2 + 2	Apply either 30 or 60 days prior to planting depending on the rate used (see comments).	Annual broadleaf and grass weeds.	Crop injury may occur if there are excessively cool temperatures or wet conditions. See label for tank-mix partners and insecticide restrictions. Apply with nonionic surfactant (NIS) at 0.25% v/v or crop oil concentrate (COC) at 1% v/v. Preplant with intervals: 1.5 oz. = 30 day plant back, >1.5–2 oz. = 60 day plant back 1.5–2.7 oz. and 0 days prior to planting with Bolt technology
Liberty 280 SL	glufosinate- ammonium	12 hr./ 70 d	29–36 fl.oz.	0.53–0.66 lb.	10	Apply as a burndown treatment prior to planting or prior to emergence.	Annual broadleaf and grass weeds	A single application of up to 36 fl.oz./A may be made. If 29–36 fl.oz./A are used in a single burndown application, one additional in-season application may be made at up to 29 fl.oz./A. The season total may not exceed 65 fl.oz./A, including all application timings. See label for tank- mix partners. Thorough spray coverage is essential for optimum performance. Apply in at least 15 gallons of water per acre. Dense weed canopies require .20 to 40 gallons of water per acre.
Sharpen	saflufenacil	12 hr/3 d	1–2 fl oz	0.02–0.04 lb	14	Apply preplant in the fall or early spring.	Broadleaf weed control; excellent on horseweed (marestail)	Excellent for horseweed control. Apply with a methylated seed oil (MSO) at 1% v/v. See label for tank-mix partners and insecticide restrictions. A 44-day plant back restriction to soybean on coarse soils with less than 2% organic matter at the 2 ounce rate; 30 day plant back on all other soils. At the 1 and 1.5 oz rate, 30 day plant back, 0 and 14 days on all other soils. See label for specifics on minimum preplant intervals.

Table 12. Soybean Weed Control (cont.)								
Herbicide (trade name)	Herbicide (common name)	REI/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
BURNDOWN FOR MINIMUM TILL, STRIP-TILL, OR NO-TILL SOYBEANS (cont.)								
Trivence	chlorimuron-ethyl + flumioxarin + metribuzin	12 hr./N/A	6.0–10 oz.	0.612–1.02 lb.	2 + 5 + 14	Apply anytime from fall to spring, up to 3 days after planting.	Fall and spring annuals, biennial, and perennial broadleaf weeds.	Plant soybeans 1.5 inches deep and completely cover seeds. Needs water for activator. Do not apply to Black Belt soils with a soil pH greater than 7.0 or history of nutrient deficiency. See label for additives.
Various	2, 4-D amine	48 hr./7 d	16–32 fl.oz.	0.5–1.0 lb. (4 lb. ai/gal.)	4	Apply 14 to 30 days before planting.	Annual and biennial broadleaf weeds	See label for tank-mix options and spray drift management control. As a general rule, apply esters when temperatures are less than 60°F degrees and amines when more than 60°F. Soybeans can be planted in 7 (ester) or 15 (amine) days after application depending on the formulation used.
Various	2, 4-DB	48 hr./60 d	0.7–0.9 pt.	0.175–0.225 lb. (2 lb. ai/gal.)	4	Apply preplant through preemergence.	Small broadleaf weeds	Add a NIS at 0.5% v/v. See label for specific weeds it will control.
Various	glyphosate	4 hr./7 d	32–64 fl.oz. (3lb ae) 24–35 fl.oz. (4.17 ae) 22–32 fl.oz. (4.5lb ae)	0.75–1.1 lb. ae	9	Apply preplant up to crop emergence.	Several winter and summer annual, biennial, perennial grass and broadleaf weeds	Vary glyphosate rates based on weed sizes and whether they are annual or perennial weeds. Apply in 10–20 gallons of water per acre. The use of a soil residual herbicide is mandatory for optimum weed control and resistance management. Glyphosate formulations vary on adjuvant requirements; check labels.
Verdict	saflufenacil + dimethenamid-P	12 hr./N/A	5–10 fl.oz.	0.22–0.435 lb.	14 + 15	Apply preplant in the fall or early spring.	Annual broadleaf, grass, sedges, and horseweed (mares tail)	Do not apply Verdict where an at-planting application of an organophosphate or carbamate insecticide is planned and/or has occurred because severe injury may result. See label for exceptions. Use a methylated seed oil (MSO) 1 gal./100 gals. (1% v/v). A 44-day plant back restriction to soybean on coarse soils with less than 2% organic matter at the 10 ounce rate; 30 day plant back on all other soils. At the 5 and 7.5 fl. oz rate, 0 and 14 days on all other soils. See label for specifics on minimum preplant intervals.

Table 12. Soybean Weed Control (cont.)

Herbicide (trade name)	Herbicide (common name)	RE/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
PREPLANT-INCORPORATED FOR SOYBEANS								
Prowl H20	pendimethalin	24 hr./85d	1.5–2.0 pt.	0.7–1.0 lb.	3	Apply within 60 days of planting and incorporate.	Grasses and small-seeded broadleaves.	Incorporate 1 to 2 inches deep immediately after application. Use low rate on coarse soils, intermediate rate of medium soils, and high rate on fine-textured clay soils.
Scepter 70 DG	imazaquin	12 hr./90 d	1.4–2.8 oz..	0.125–0.25 lb. ai	2	Apply up to 30 days before, during, or after planting but before crop emerges.	Annual broadleaves, some grasses, yellow nutsedges suppressions	See label for tank-mix partners. Do not graze or feed treated soybean forage, hay, or straw to livestock.
Treflan	trifluralin	12 hr./N/A	1–2.0 pt.	0.5–1.0 lb.	3	Apply several weeks to immediately before planting in the spring.	Grasses and small-seeded broadleaves.	Incorporate 2 to 3 inches deep within 24 hours of application. It should be applied within 4 weeks of planting. Rates should be adjusted for soil type.
PREPLANT/PREEMERGENCE FOR SOYBEANS								
Afforia	flumioxazin + thifensulfuron-methyl + tribenuron-methyl	12 hr./	2.5–3.75 oz.	0.31–0.46 lb.	2 + 14	Apply preplant or preemergence within 3 days after planting but before soybean emerges.	Broadleaf weeds, partial control of nutsedge and annual grasses.	Plant at least 1.5 inches deep, completely covering the seed. Residual control requires rainfall. Do not apply within 100 ft of cotton crops. See label for additional restrictions. Crop response may occur if applied with organophosphates. Use a COC at 1% or an NIS at 0.25%.
Authority First/Sonic	sulfentrazone + clorasulfam methyl	12 hr./65 d	6.45–8 fl.oz.	0.28–0.35 lb.	14 + 2	Apply preplant to preemergence within 3 days of planting.	Pigweeds, prickly sida, morningglory, horseweed, common ragweed, yellow nutsedge, other broadleaves.	See label for tank-mix partners. Do not apply more than 8 ounces per season. Sonic is now labeled for aerial application. Do not apply Sonic to soils classified as sands containing less than 1% organic matter.
Authority MTZ	sulfentrazone + metribuzin	12 hr./N/A	8–12 oz.	0.23–0.34 lb.	14 + 5	Apply preplant to preemergence.	Pigweed, morningglory, prickly sida, most broadleaf weeds.	See label for tank-mix partners. Do not apply more than 9.6 ounces per year. Do not apply to Black Belt soils with a pH of more than 6.8 or history of nutrient deficiency.

Table 12. Soybean Weed Control (cont.)

Herbicide (trade name)	Herbicide (common name)	RE/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
PREPLANT/PREEMERGENCE FOR SOYBEANS (cont.)								
Authority XL	sulfentrazone + chlorimuron	12 hr./N/A	5–8 oz.	0.219–0.35 lb.	14 + 2	Apply preplant to preemergence within 3 days of planting.	Pigweed, morningglory, prickly sida, most broadleaf weeds.	Do not follow Authority XL with a postemergence application of another chlorimuron containing herbicide the same cropping season. Course soils, apply 5–6; medium soils, 6.5–7.5; fine soils, 7.0–8.0.
Axiom PF	flufenacet + metribuzin	12 hr./N/A	7–13 oz.	0.64–1.19 lb.	5 + 15	Apply up to 14 days before planting.	Annual grasses and broadleaf weeds.	Moisture needed to activate. For PPI applications, avoid deep incorporation. If weeds are present, add glyphosate. Don't use on a muck soil.
Basis Blend (Various)	rimsulfuron + thifensulfuron-methyl	4 hr./N/A	0.825–2.5 oz.	0.172–0.194 lb.	2	Apply 15 days or more prior to planting.	Grasses and broadleaves.	Do not apply on sandy soils. Do not apply with foliar-applied organophosphate. See label for restrictions. (To be used with BOLT soybeans) . See label for tank mixes and additives.
Boundary 6.5 EC	S-metolachlor + metribuzin	12 hr./90 d	1.2–2.1 pt.	0.98–1.71 lb.	15 + 5	Apply preplant to preemergence.	Small-seeded broadleaves and grasses and yellow nutsedge.	See label for sensitivity of certain soybean varieties. Do not use on sands with less than 0.5% organic matter. See label for tank-mix partners.
Canopy EX	chlorimuron + tribenuron	12 hr./N/A	1.1–3.3 oz.	0.23–0.70 lb.	2 + 2	Apply early preplant to preemergence up to 7 days before planting.	Winter and summer annual weeds.	See label for tank-mix partners. Do not apply to Black Belt soils with a pH greater than 7 or a history of nutrient deficiency. Use a minimum of 20 gallons of water per acre.
Command 3ME	clomazone	12 hr./N/A	1.3–3.3 pt.	0.5–1.25 lb.	13	Apply at planting.	Annual grasses and broadleaf weeds.	See label for tank-mix partners and drift-reducing instructions. Do not plant wheat within 12 months of application.
Dual II Magnum/CinchorCharger Basic	S-metolachlor	24 hr./30 d	Coarse: 1–1.33 pt. Medium: 1.33–1.67 pt. Fine: 1.33–1.67 pt.	Coarse: 0.96–1.27 lb. Medium: 1.27–1.59 lb. Fine: 1.27–1.59 lb.	15	Apply preemergence.	Annual grasses, small-seeded broadleaf weeds, and yellow nutsedge.	See label for tank-mix partners.
Envive	flumioxazin + chlorimuron-ethyl thifensulfuron-methyl	12 hr./N/A	2.5–5.3 oz.	0.38–0.80 lb.	14 + 2 + 2	Apply early preplant to preemergence up to 3 days before planting.	Winter and summer annual weeds.	See label for tank-mix partners. Do not apply to Black Belt soils with a pH greater than 7 or a history of nutrient deficiency. Do not apply more than 4 ounces per season.

Table 12. Soybean Weed Control (cont.)

Herbicide (trade name)	Herbicide (common name)	REI/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
PREPLANT/PREEMERGENCE FOR SOYBEANS (cont.)								
Metribuzin	metribuzin	12 hr./ 90 d	Coarse: DO NOT USE Medium: 0.5–0.6 lb. Fine: 0.6–0.83 lb.	Coarse: DO NOT USE Medium: 0.38–0.5 lb. Fine: 0.5–0.6 lb.	5	Apply preemergence before crop emerges.	Annual grasses and broadleaf weeds.	See label for tank-mix partners and special precautions. Soybeans should be planted at least 1.5 inches deep to avoid crop injury. Needs a minimum amount of soil moisture to activate.
Outlook	dimethenamid-P	12 hr/ N/A	Coarse: 10–14 fl oz Medium: 14–16 fl oz Fine: 16–18 fl oz	Coarse: 0.47–0.66 lb Medium: 0.66–0.75 lb Fine: 0.75–0.84 lb	15	Apply 0 to 14 days before planting.	Annual grasses and small-seeded broadleaf weeds.	See label for tank-mix partners. Do not use more than 21 fluid ounces of Outlook per season.
Prefix	fomesafen + S-metolachlor	24 hr./ 90 d	2 pt.	1.33 lb.	14 + 15	Apply preplant to preemergence.	Annual grasses and broadleaf weeds. Morningglories, pigweed, Pennsylvania smartweed.	A maximum of 3 pints per acre can be applied within a single cropping season. Rain is needed after application for activation or can be shallowly incorporated.
Prowl H20	pendimethalin	24 hr/ 85 d	Coarse: 1.2–1.8 pt. Medium: 1.8–2.4 pt. Fine: 1.8–3.6 pt.	Coarse: 0.5–0.75 lb. Medium: 0.75–1.0 lb. Fine: 1.0–1.5 lb.	3	Apply within 2 days of planting.	Annual grasses and small-seeded broadleaf weeds.	Rainfall is needed within 1 week for activation. Cool, rainy weather, seedling diseases, drought, or low or high soil pH can weaken seedlings and increase the possibility of crop damage.
Python WDG	flumetsulam	12 hr./ 85 d	Coarse: 0.8–0.89 oz. Medium: 0.89–1.25 oz. Fine: 0.89– 1.25 oz.	Coarse: 0.04–0.045 lb. Medium: 0.045–0.05 lb. Fine: 0.045–0.05 lb.	2	Apply at planting or after planting but before weed emergence.	Broadleaf weeds.	Do not apply to emerged soybeans (cracking stage or later) as severe crop injury will result. Do not plant cotton within 18 months of application or grain sorghum within 12 months of application. See label for tank-mix partners and other rotational crops.

Table 12. Soybean Weed Control (cont.)

Herbicide (trade name)	Herbicide (common name)	RE/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
PREPLANT/PREEMERGENCE FOR SOYBEANS (cont.)								
Scepter 70 DG	imazaquin	12 hr./90 d	1.4–2.8 oz..	0.125–0.25 lb. ai	2	Apply up to 30 days before, during, or after planting but before crop emerges.	Annual broadleaves, some grasses, yellow nutsedge suppression.	See label for tank-mix partners. Do not graze or feed treated soybean forage, hay, or straw to livestock.
Sequence	S-metolachlor + glyphosate	24 hr./90 d	Coarse: 2.5–3.5 pt. Medium: 3.5–4 pt. Fine: 3.5–4 pt.	Coarse: 1.64–2.30 lb. Medium: 2.30–2.62 lb. Fine: 2.30–2.62 lb.	15 + 9	Apply before, during, or after planting before crop emerges.	Grasses and broadleaf weeds.	See label for tank-mix partners and adjuvant requirements. Do not exceed 4.0 pints/acre of Sequence per year as a preplant or preemergence application. Sequence can also be applied postemergence to Roundup Ready soybeans.
Sonic	sulfentrazone + chlorimuron-methyl	12 hr./65 d	6.45 oz..	0.25–0.032 lb.	14 + 2	Apply at planting time or within 3 days.	Broadleaf and grass control.	See label for rotational crop guidelines.
Surveil	cloransulam-methyl + flumioxazin	12 hr./N/A	2.1–4.2 oz.	0.27–0.55 lb.	14 + 2	Apply within 3 days of planting but prior to soybean emergence.	Broadleaf and some grass weeds.	Do not tank-mix with Group 15 herbicides within 14 days of planting soybeans unless soybeans are planted under no-till or minimum tillage conditions on wheat stubble or no-till field or stubble. See label for tank-mix partners.
Trivence	chloimuron-ethyl + flumioxarin + metribuzin	12 hr./N/A	6.0–10 oz.	0.612–1.02 lb.	2 + 5 + 14	Apply anytime from fall to spring, up to 3 days after planting.	Fall and spring annuals, biennial, and perennial broadleaf weeds.	Plant soybeans 1.5 inches deep and completely cover seeds. Needs water for activation. Do not apply to Black Belt soils with a soil pH greater than 7.0 or history of nutrient deficiency. See label for additives.
Valor SX, Rowel, others	flumioxazin	12 hr./N/A	2–3 oz.	0.063–0.096 lb.	14	Apply within 3 days of planting but prior to soybean emergence.	Morningglory, pigweeds, prickly sida, and several other small-seeded broadleaf weeds.	See label for tank-mix partners. Do not use with flufenacet, alachlor, metolachlor/S-metolachlor, or dimethenamid-P or injury may occur. Limited grass control. Apply in 10 to 30 gallons of water per acre. Soybean injury may occur under extended cool and wet growing conditions following planting.

Table 12. Soybean Weed Control (cont.)

Herbicide (trade name)	Herbicide (common name)	RE/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
PREPLANT/PREEMERGENCE FOR SOYBEANS (cont.)								
Valor XLT	flumioxazin + chlorimuron	12 hr./ N/A	3–4 oz.	0.47–0.62 lb.	14 + 2	Apply within 3 days of planting but prior to soybean emergence.	Prickly sida, morningglories, pigweeds, several other broadleaf weeds and some grasses.	Do not tank-mix with fluthiamide, S-metolachlor, dimethenamid, dimethenamid-P, or alachlor unless directed by state (2ee) or 24c labeling. Do not apply within 14 days before or after an application of an organophosphate insecticide or on any soybean variety that is not DuPont STS or STS/RR. Apply in 10 to 30 gallons of water per acre. See label for tank-mix partners. Do not apply to Black Belt soils with a soil pH greater than 7.0 or a history of iron chlorosis.
Various	2, 4-DB	48 hr./ 60 d	0.7–0.9 pt.	0.175–0.225 lb. (2 lb. ai/gal.)	4	Apply preplant through preemergence.	Small broadleaf weeds	Add a NIS at 0.5% v/v. See label for specific weeds it will control.
Zidua	pyroxasulfone	12 hr./0 d	Coarse: 1.5–2.0 oz. Medium: 2.0–3.0 fl oz. Fine: 2.5–3.5 fl oz.	Coarse: 0.11–0.15 lb. Medium: 0.15–0.22 lb. Fine: 0.22–0.26 lb.	15	Apply before planting before crop emerges.	Italian ryegrass, pigweeds, prickly sida, other grasses, broadleaf weeds, and yellow nutsedge.	See label for tank-mix partners. Do not apply more than 2.1 ounces on coarse soils or more than 3.5 ounces on all other soils per cropping season.
POSTEMERGENCE FOR SOYBEANS								
Aim EW	carfentrazone-ethyl		0.25–0.5 fl.oz.	0.004–0.007 lb.	14	Apply over the top from V3-V10 to actively growing weeds up to 4 inches tall and rosettes less than 3 inches across.	Broadleaf weeds.	Use with a nonionic surfactant at 0.25% v/v (2 pints per 100 gallons of spray solution). Do not use with diphenylether herbicides. See label for tank-mix partners.

Table 12. Soybean Weed Control (cont.)

Herbicide (trade name)	Herbicide (common name)	RE/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
POSTEMERGENCE FOR SOYBEANS (cont.)								
Assure II	quizalofop-P ethyl	12 hr./80 d	5–10 fl.oz.	0.034–0.069 lb.	1	To grow soybeans before soybean pod set and/or 80 days before soybean harvest.	Annual and perennial grasses.	Add a crop oil concentrate (COC) at 1% v/v or nonionic surfactant (NIS) at 0.25% v/v. If annual or perennial grasses regrow, a second application may be applied. See label for rates and timing. Do not apply more than 1.25 pints per season and if rain is expected within 1 hour after application. Do not graze treated fields or harvest for forage or hay; do not cultivate 7 days before or after application or control may be unsatisfactory.
Basagran	bentazon	48 hr./30 d	1.5–2.0 pt.	0.75–1.0 lb.	6	Apply postemergence at any growth stage but 30 days before harvest.	Cocklebur, 2–3 inch prickly sida, smartweed, and other broadleaf weeds.	See label for tank-mix partners and insecticide restrictions. Leaf-bronzing may occur after application but crop will outgrow this within 10 days. The addition of 2,4-DB (Butyrac) will improve morningglory control.
Classic, Curio	chlorimuron-ethyl	12 hr./60 d	0.5–0.75 oz.	0.008–0.012 lb.	2	Any time after first trifoliolate but no later than 60 days prior to maturity	Sicklepod, hemp sesbania, smartweed, ragweed, pigweed, other broadleaf weeds	Add a crop oil concentrate (COC) at 1% v/v or nonionic surfactant (NIS) at 0.25% v/v. See label for rates, timing, and tank-mix partners. Do not tank-mix with Pythron or any organophosphate insecticides or apply Classic within 14 days before or after an application of an organophosphate insecticide. Do not use on soils with a history of nutrient deficiency.
Cobra	lactofen	12 hr./45 d	12.5 fl.oz.	0.2 lb.	14	Apply postemergence but if possible, before the third trifoliolate stage as to not interfere with the spray pattern, thus reducing coverage of the weed leaves.	Ballonvine, morningglory, prickly sida, ragweed, pigweed, and others broadleaf weeds.	Temporary leaf burn or speckling will occur after application but crop will outgrow this. Do not cultivate prior to or during application. Spray in 10 to 20 gallons of water per acre and a spray pressure of 40 to 60 psi measured at the boom. Use with a crop oil concentrate at 0.25% v/v.

Table 12. Soybean Weed Control (cont.)

Herbicide (trade name)	Herbicide (common name)	REI/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
POSTEMERGENCE FOR SOYBEANS (cont.)								
Firstrate	cloransulam-methyl	12 hr./ 70 d	0.3–0.6 oz.	0.022–0.045 lb.	2	Apply postemergence any time prior to R2 (full flower) growth stage	Common cocklebur, morningglory, sicklepod, ragweed	See label for tank-mix partners. The season max rate for Firstrate is 1.05 oz/acre. The PHI for forage/hay is 25 days. Apply with nonionic surfactant at 0.25% v/v or crop oil concentrate or methylated seed oil at 1.2% v/v. See label for additional adjuvant systems.
Flexstar, Reflex	fomesafen	24 hr./ 45 d	1.0–1.5 pt.	0.24–0.35 lb.	14	Apply to actively growing weeds.	Morningglory, pigweed, hemp sesbania	May cause temporary foliar bronzing/burn. Always add nonionic surfactant (NIS) at 0.25% v/v or crop oil concentrate (COC) at 0.5% v/v. Also sold as premix Flexstar GT 3.5.
Fusilade DX	fluzifop-p-butyl	12 hr./ 60 d	6–12 fl.oz.	0.094–0.188 lb.	1	Apply to actively growing grasses.	Perennial and annual grass weeds.	Add a crop oil concentrate (COC) at 0.5–1% v/v (0.5–1 gal./100 gal.) or a nonionic surfactant (NIS) at 0.25–0.5% v/v (1–2 qt./100 gal.) in the finished spray volume. Do not apply more than 30 fl.oz. per acre per season to soybeans. Do not apply more than 24 fl.oz. to soybeans prebloom (up to V5 growth stage). Do not apply more than 6 fl.oz. per acre to soybeans from bloom through post-bloom (R1 growth stage or later). Use lower rate for most annual grasses before they reach 4 inches tall. Controls volunteer Roundup Ready corn in soybeans. See label for tank-mix partners.
Liberty 280 SL (FOR USE ON LIBERTY LINK OR GLUFOSINATE TOLERANT SOYBEAN VARIETIES ONLY)	glufosinate- ammonium	12 hr./ 70 d	22–36 fl.oz.	0.40–0.66 lb.	10	Apply to actively growing weeds from crop emergence to just before bloom.	Summer annual grass and broadleaf species.	FOR LIBERTY-LINK SOYBEAN CULTIVARS ONLY. Apply early to small-sized weeds for best control. A follow-up application of Liberty 7 to 10 days after the first application may be needed to control Palmer amaranth that is over 5 inches tall. Use in at least 15 gallons of water per acre. Do not apply more than 65 fluid ounces per acre in a single season. A single application use rate can be as high as 36 fluid ounces per acre.

Table 12. Soybean Weed Control (cont.)						
Herbicide (trade name)	Herbicide (common name)	REI/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application
			Formulation	Active Ingredient		
POSTEMERGENCE FOR SOYBEANS (cont.)						
RoundUp Powermax (4.5 ae), Generic Glyphosate (4.17 ae, 4.0 ae, 3.0 ae) (FOR USE ON ROUNDUP READY SOYBEAN VARIETIES ONLY)	glyphosate	4 hr./ 7 d	32–64 fl.oz. (3 lb. ae) 32–47 fl.oz. (4.0 lb ae) 24–35 fl.oz. (4.17 lb. ae) 22-32 fl.oz. (4.5 lb ae)	0.75–1.13 lb. ae	9	Apply from soybean emergence through R3 (1/4 inch pod visible on a least one of the top 4 nodes on the main stem)
Poast Plus	sethoxydim	12 hr./75 d	1.5–2.25 pt.	0.188–0.28 lb.	1	Apply to actively growing grasses.
Prefix	fomesafen + S-metolachlor	24 hr./ 90 d	2.0–2.33 pt.	1.32–1.54 lb.	14 + 15	Apply when soybean is in the 1 to 3 trifoliolate growth stage.
Scepter 70 DG	imazaquin	12 hr./ 90 d	1.4–2.8 oz..	0.125–0.25 lb. ai	2	Apply up to 30 days before, during, or after planting but before crop emerges.
						Annual and perennial grass and broadleaf weeds. Glyphosate-resistant weeds are found throughout the state of Alabama.
						FOR USE ON ROUNDUP-READY SOYBEAN CULTIVARS ONLY. Consider tank-mixing with a residual herbicide for resistance management. See label for specific tank-mix partners and instructions. Avoid drift to nearby crops or vegetation. Repeat applications may be required to maintain control. Dry conditions will reduce control. Do not apply more than 2.25 pounds (ae) per acre of glyphosate in a single growing season.
						Always add a crop oil concentrate (COC) at 0.5% v/v. For best results, make applications to grasses before they reach 4 inches tall. Do not apply to grasses under drought conditions or if rainfall is expected within 1 hour after application. Do not use more than 7.5 pints per acre of Poast Plus in one season.
						Add nonionic surfactant (NIS) at 0.25% v/v to the final spray volume. Do not use a crop oil concentrate (COC). See label for tank-mix partners. A maximum of 3 pints per acre can be applied within a single cropping season. Rain is needed after application for activation or can be shallowly incorporated.
						Annual grasses and broadleaf weeds. Morningglories, pigweed, Pennsylvania smartweed.
						Annual broadleaves, some grasses, yellow nutsedge suppression.
						See label for tank-mix partners. Do not graze or feed treated soybean forage, hay, or straw to livestock.

Table 12. Soybean Weed Control (cont.)

Herbicide (trade name)	Herbicide (common name)	REI/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
POSTEMERGENCE FOR SOYBEANS (cont.)								
Select Max	clethodim	24 hr./60 d	9–16 fl.oz.	0.75–0.125 lb.	1	Apply postemergence to actively growing grasses.	Annual and perennial grasses.	Do not apply a postemergence broadleaf herbicide within one day following application of Select Max or reduced grass control may result. For perennial grasses, rates of 12 to 32 fluid ounces per acre may be used. Always use a crop oil concentrate (COC) or methylated seed oil (MSO) at 1% v/v or a nonionic surfactant at 0.25% v/v.
Sequence (FOR USE ON ROUNDUP READY SOYBEANS ONLY)	S-metolachlor + glyphosate	24 hr./90 d	2.5–4 pt.	1.64–2.62 lb.	15 + 9	Apply postemergence up to 3rd trifoliolate stage.	Grasses and broadleaf weeds.	See label for tank-mix partners and adjuvant requirements. Do not exceed 3.5 pints/acre of Sequence per season. Sequence can also be applied postemergence to Roundup Ready soybeans. (FOR USE ON ROUNDUP READY SOYBEANS ONLY)
Storm	bentazon + acifluorfen	48 hr./50 d	1–1.5 pt.	0.5–0.75 lb.	6 + 14	Apply from preemergence at cracking stage or postemergence.	Annual broadleaves.	See label for additives. An additive needs to be included.
Synchrony XP	chlorimuron + thifensulfuron	12 hr./60 d	0.375 oz.	0.0067 lb.	2 + 2	Apply to 1- to 4- inch weeds that are actively growing and to soybeans from before emergence up to 60 days before soybean harvest.	Morningglory, hemp sesbania, small pigweeds and sicklepod, yellow nutsedge, and other broadleaf weeds.	Add a crop oil concentrate (COC) at 1% v/v or a nonionic surfactant at 0.25% v/v. See label for tank-mix partners and adjuvant requirements with tank-mixes.
Ultra Blazer	acifluorfen	48 hr./50 d	0.5–1.5 pt.	0.125–0.375 lb.	14	Apply to small, actively growing broadleaf weeds according to weed growth stage.	Morningglory, hemp sesbania, groundcherry species, pigweeds less than 2 inches tall.	Add a crop oil concentrate (COC) at 0.5% v/v or a nonionic surfactant (NIS) at 0.25% v/v; see label for required adjuvant if tank-mixing. Foliar burn will occur but plants will grow out of it. See label for tank-mixing partners.
Various	2, 4-DB	48 hr./60 d	Prebloom: 0.73 pt. Bloom: 0.89 pt	Prebloom: 0.183 lb. Bloom: 0.22 lb.	4	Apply 7–10 before bloom up to mid-bloom.	Emerged small seeded broadleaf weeds.	Check label for tank-mix partners. Don't use more than 1.6 pt/A per season. Add an NIS at 0.5% v/v.

Table 12. Soybean Weed Control (cont.)

Herbicide (trade name)	Herbicide (common name)	REI/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
POSTEMERGENCE FOR SOYBEANS (cont.)								
Zidua	pyroxasulfone	12 hr./0 d	Coarse: 1.0–2.1 oz. Medium: 1.5–3.0 fl oz. Fine: 2.0–3.5 fl.oz.	Coarse: 0.07–0.15 lb. Medium: 0.11–0.22 lb. Fine: 0.15–0.26 lb.	15	Apply from 1st trifoliolate stage to 3rd trifoliolate stage	Pigweeds, prickly sida, and other grass and broadleaf species.	See label for tank-mix partners. Do not apply more than 2.1 oz/acre per season to coarse soils and more than 3.5 oz/acre per season to all other soils. Do not apply to soybean from emergence (cracking) through unifoliolate or injury may occur.
HARVEST AIDS FOR SOYBEANS								
Aim EC	carfentrazone-ethyl	12 hr./ 3 d	1–2 oz.	0.016–0.023 lb.	14	Apply when soybeans are fully mature and developed with 50% natural defoliation and the remaining leaves are yellow.	Morningglory desiccation.	Do not apply more than 1.5 ounces per acre per season. Do not apply within 3 days of harvest. See label for tank-mix partners. Add a nonionic surfactant (NIS) at 0.25% v/v or a crop oil concentrate (COC) at 1% v/v.
ET	pyraflufen-ethyl	12 hr./ 90 d	0.5–2.0 fl. oz.	0.00081–0.00325 lb.	14	Apply after all pods have lost green color.	Broadleaf weeds	Apply in a minimum of 10 gallon of water per acre. A COC is recommended at 1%–2% v/v. Allow a minimum of 30 days between applications. Use as COC at 1.0%–2.0% v/v.
RoundUp Powermax (4.5 ae), Generic Glyphosate (4.0 ae, 4.17 ae 3.0 ae)	glyphosate	4 hr./ 7 d	32–64 fl.oz. (3 lb. ae) 32–47 fl.oz. (4.0 lb ae) 24–35 fl.oz. (4.17 lb. ae) 22–32 fl.oz. (4.5 lb ae)	0.75–1.13 lb. ae	9	Apply after all pods have lost green color.	Annual and perennial grasses and some broadleaf weeds.	Use 10 to 20 gallons of water per acre for ground applications. Do not apply to soybeans grown for seed. Do not apply more than 3.5 lb ae per acre for preharvest applications. Do not apply more than 1.5 lb ae of glyphosate per acre by air.
Sodium Chlorate, Defol 5, others	sodium chlorate	12 hr./ 7 d	4.8 qt. (5 lb./gal.) 3.2 qt. (7.5 lb./gal.)	5.0–7.5 lb.	NC	Apply to soybeans ready to harvest 7 to 10 days prior to harvest.	Will desiccate most weeds that receive adequate coverage.	Apply in a minimum 20 gallons of water per acre by ground or 5 gallons per acre by air. Do not graze treated fields or feed treated soybean foliage. Do not apply under drift favoring conditions. Immature soybeans will be injured and yields reduced.

Table 12. Soybean Weed Control (cont.)

Herbicide (trade name)	Herbicide (common name)	REI/PHI (Hours or Days)	Rate/Acre Broadcast		Herbicide Group	Time of Application	Weeds Controlled	Comments
			Formulation	Active Ingredient				
HARVEST AIDS FOR SOYBEANS (cont.)								
Sharpen	saflufenacil	12 hr./3 d	1–2 fl.oz.	0.02–0.04 lb.	14	Apply when soybeans have reached physiological maturity.	Will desiccate most broadleaf weeds that receive adequate coverage.	Apply to indeterminate varieties with at least 65% brown pods and 70% defoliation or when seed moisture is 30% or less. Apply to determinate varieties when seed are fully developed with greater than 50% defoliation and remaining leaves are yellowing.
Gramoxone SL, etc.	paraquat	12 hr./ 15 d	8–16 fl.oz.	0.13–0.26 lb.	22	Apply when soybeans are fully developed with at least one-half of the leaves dropped and remaining leaves turning yellow.	Will desiccate most weeds that receive adequate coverage.	Apply to indeterminate varieties with at least 65% brown pods or when seed moisture is 30% or less. Apply to determinate varieties when seed are fully developed with greater than 50% defoliation and remaining leaves are yellowing. Use in a minimum of 20 gallons of water per acre by ground. Do not graze or harvest for forage or hay. Do not apply under conditions which favor drift.

Table 13. Weed Response to Soybean Herbicides

Herbicides	2, 4-D, (Various)	Clarity, Sterling Blue, Vision, others	Glyphosate (Various)	Liberty 280 SL	Sharpen	Verdict	Gramoxone SL, Firestorm/ Parazone
Application Timing	BURNDOWN						
Site of Action Group	4	4	9	10	14	14 + 15	22
Weeds							
PERENNIAL WEEDS							
Bermudagrass	N	N	P-F	P	N	P	P
Johnsongrass (rhizome)	N	N	G-E	P-F	N	N	N
Yellow Nutsedge	P-F	P	F-G	P	N	F	P-F
Purple Nutsedge	N	P	F-G	P	N	N	P-F
ANNUAL GRASSES							
Barnyardgrass	P	P	E	F-G	P	G	E
Broadleaf Signalgrass	N	P	E	F-G	P	F	E
Crabgrass	N	P	E	F-G	P	G	E
Crowfootgrass	N		E	G	P	G	G
Fall Panicum	N	P	E	G	P	G	G
Goosegrass	P	P	E	P	P	G	G
Johnsongrass (seedling)	N	N	E	G	P	G	G
Texas Panicum	N		E	G	P	G	G
BROADLEAF WEEDS							
Balloonvine			G	E			P
Cocklebur	E	E	E	E	F	F	G
Coffee Senna			G				
Common Ragweed	G	E	G	G			G
Hophorn Copperleaf			P-F	G			F-G
Cutleaf Groundcherry	E	E	E	F			F-G
Hemp Sesbania	G	E	F	G-E	F	F	P
Horseweed	G	E	F-G ¹	G	G	G	
Jimsonweed	E	E	G	G			G
Lambsquarter	E	E	G	E	F-G	F-G	F-G
Cypressvine Morningglory	E	E	F	G-E	F	F	F
Entireleaf Morningglory	E	E	F	G-E	F	F	F-G
Ivyleaf Morningglory	E	E	F	G-E	F	F	F-G
Pitted Morningglory	E	E	P-F	G-E	F	F	F-G
Purple Morningglory	E	E	P-F	G	F	F	
Red Morningglory	E	E	F	G-E	F	F	F-G
Smallflower Morningglory	E	E	F	G-E	F	F	F-G
Tall Morningglory	E	E	F	G-E	F	F	F-G
Palmer Pigweed	G-E	G-E	G-E ¹	F-G	E	E	F-G
Pennsylvania Smartweed	G	E	G	G-E	P	P	P-F
Prickly Sida	G	E	P-F	P-F	F-G	F-G	P-F
Purslane	G	E	G	G			G
Showy Croton	G	G	G				G
Sicklepod	G	E	E	G	P-F	P-F	G
Spurge			G	G			P-F
Spurred Anoda	E	E	F-G	F-G			G
Tropic Croton	G	G	G	G			G
Velvetleaf	G	F-G	G	E			F

E = >90% control G = 80–90% control F = 70–80% control P = <70% control N = No control

¹ unless Gly-Resistant ²ALS-Resistant

Table 13. Weed Response to Soybean Herbicides (cont.)

Herbicides	Prowl H2O	Treflan	Authority First/Sonic	Authority MTZ	Authority XL	Boundary	Canopy DF
Application Timing	PPI		PRE				
Site of Action Group	3	3	14 + 2	14 + 5	14 + 2	15 + 5	5 + 2
Weeds							
PERENNIAL WEEDS							
Bermudagrass	P	P					P
Johnsongrass (rhizome)	P	P	N	N	P	N	P
Yellow Nutsedge	P	P	F-G	F-G	E	F-G	P-F
Purple Nutsedge	P	P					
ANNUAL GRASSES							
Barnyardgrass	E	E	P-F	F	F	G	F-G
Broadleaf Signalgrass	G	G	P-F	F	F	G	F
Crabgrass	E	E	P-F	F	F	G	F-G
Crowfootgrass	E	E					G
Fall Panicum	E	E	P-F	F	F	G	F-G
Goosegrass	E	E	P-F	P-F	P-F	G	F-G
Johnsongrass (seedling)	E	E	N	P	P-F	F	F-G
Texas Panicum	G-E	G-E					
BROADLEAF WEEDS							
Balloonvine	P	P				E	G
Cocklebur	P	P	F-G	F-G	E	P-F	E
Coffee Senna	P	P			E		G
Common Ragweed	P	P	G	G	G	E	E
Hophorn Copperleaf	P	P	G	E	E	E	G
Cutleaf Groundcherry			G			E	E
Hemp Sesbania	P	P		G	P-F	E	E
Horseweed				G			G
Jimsonweed	P	P	G	F	G	G	G
Lambsquarter	G-E	G-E		G-E	G-E		G-E
Cypressvine Morningglory	P	P			E		F-G
Entireleaf Morningglory	P	P	G	E	E	P	G
Ivyleaf Morningglory	P	P	G	E	E	F-G	G
Pitted Morningglory	P	P	E	E	E	F-G	G
Purple Morningglory	P	P			E		
Red Morningglory	P	P			E		
Smallflower Morningglory	P	P	F-G	E	E	G	E
Tall Morningglory	P	P			E		F-G
Palmer Pigweed	G	G	F-G	E	E	G	G
Pennsylvania Smartweed	P	P	E	E	E	E	E
Prickly Sida	P	P	F-G	G	P	E	E
Purslane	E	E	E	G	G	E	E
Showy Croton	P	P				F	
Sicklepod	P	P		F-G	F	F-G	F-G
Spurge			G	G	G	E	E
Spurred Anoda	N	N	G			E	E
Tropic Croton	P	P			E		G
Velvetleaf	P	P	G	G	E	G	E

E = >90% control G = 80–90% control F = 70–80% control P = <70% control N = No control

¹ unless Gly-Resistant ²ALS-Resistant

Table 13. Weed Response to Soybean Herbicides (cont.)

Herbicides	Canopy EX	Command 3ME	Dual II Magnum/Cinch	Envive	Fierce	Metribuzin	Outlook
Application Timing	PRE						
Site of Action Group	2 + 2	13	15	14 + 2 + 2	14 + 15	5	15
Weeds							
PERENNIAL WEEDS							
Bermudagrass		P	P	P	P	N	
Johnsongrass (rhizome)	P	P	P	P	P	N	N
Yellow Nutsedge	G	P	F-G	F-G	P	P	P-F
Purple Nutsedge		P	P	P-F	P		
ANNUAL GRASSES							
Barnyardgrass	G	E		F	F-G	G	G
Broadleaf Signalgrass	G	E	F-G	P	F-G	F	G
Crabgrass	F-G	E	G-E	P	G-E	G	E
Crowfootgrass		G	G-E	P	G-E	G	
Fall Panicum	F-G	G	G-E	P	G-E	F-G	E
Goosegrass	F-G	G	G-E	P	G-E	F-G	E
Johnsongrass (seedling)	F-G	F		P	P-F	P-F	F
Texas Panicum		F-G	P-F	P	F	P	
BROADLEAF WEEDS							
Balloonvine		P-F		F-G	F-G	E	P
Cocklebur	G	P	P	F-G	P	F	N
Coffee Senna			P	F-G	P-F	G	
Common Ragweed	G	F-G	P	G-E	G	E	E
Hophorn Copperleaf		G	P	G-E	G-E	E	P
Cutleaf Groundcherry				P-F	F-G	E	P
Hemp Sesbania	E	P	P	G-E	G	E	P
Horseweed				G	G	G	
Jimsonweed	P-F	F-G	P	G	G	G	P
Lambsquarter		G-E	F	G-E	G	G	
Cypressvine Morningglory		P	P	G	F	F-G	
Entireleaf Morningglory	G	P	P	F-G	F	P	N
Ivyleaf Morningglory	G	P	P	F-G	F	P	N
Pitted Morningglory	G	P	P	F-G	F	F-G	N
Purple Morningglory		P	P			P	
Red Morningglory		P	P	G	F	F	
Smallflower Morningglory	G	G	P-F	G-E	F	F-G	N
Tall Morningglory		P	P	F-G	F	P-F	
Palmer Pigweed	G	P	G-E	E	E	F-G	F
Pennsylvania Smartweed	E	G	P	F	P-F	E	P
Prickly Sida	F-G	G	F	G-E	G-E	E	P
Purslane	G	G	G	G-E	G-E	E	E
Showy Crotonia	G	E		G	G	F-G	P-F
Sicklepod		P	P	F	G-E	G	P
Spurge	G	G		G	E	E	G
Spurred Anoda		E		E	G	E	N
Tropic Croton		G	P	G	G	G	
Velvetleaf	F	E	P	G-E	G	G	P

E =>90% control G = 80-90% control F = 70-80% control P = <70% control N = No control

¹ unless Gly-Resistant ²ALS-Resistant

Table 12. Weed Response to Soybean Herbicides (cont.)

Herbicides	Prefix	Prowl H20, etc.	Python 80 WDG	Sequence	Valor SX	Valor XLT	Zidua
Application Timing	PRE						
Site of Action Group	14 + 15	3	2	15 + 9	14	14 + 2	15
Weeds							
PERENNIAL WEEDS							
Bermudagrass		P	N		P	P	E
Johnsongrass (rhizome)	N	P	N	E	P	P	P
Yellow Nutsedge	E	P	N	F-G	P	F-G	P
Purple Nutsedge		P	N		P	P-F	P
ANNUAL GRASSES							
Barnyardgrass	E	E	N	E	P-F	F	E
Broadleaf Signalgrass	G	G	N	E	P	P	E
Crabgrass	E	G-E	N	E	P	P	E
Crowfootgrass	G	G-E	N		P	P	G-E
Fall Panicum	P	G	N	G	P	P	G
Goosegrass	E	G	N	E	P	P	G
Johnsongrass (seedling)	F-G	G	N	E	P	P	F-G
Texas Panicum	F	G	N		P	P	F
BROADLEAF WEEDS							
Balloonvine		N	P	G	F-G	F-G	
Cocklebur	P	P	G	E	P	F-G	P
Coffee Senna		P	F		P-F	F-G	
Common Ragweed	E	P	G	E	G-E	G-E	P-F
Hophorn Copperleaf	F	P	F-G	G	G-E	G-E	G
Cutleaf Groundcherry	E	N	E	E	P-F	P-F	
Hemp Sesbania	F-G	P	N	F-G	G	G-E	G
Horseweed		P	G ²		G	G	
Jimsonweed	G	P		G	G	G	F-G
Lambsquarter	F-G	G	E		G-E	G-E	
Cypressvine Morningglory	F	P	F-G		G	G	
Entireleaf Morningglory	P-F	P	P-F	F-G	F-G	F-G	F
Ivyleaf Morningglory	P-F	P	F-G	G	F-G	F-G	F
Pitted Morningglory	P-F	P	F-G	G	F	F-G	F
Purple Morningglory	F	P	P				
Red Morningglory	F	P	F-G		G	G	
Smallflower Morningglory	P	P	G	E	G-E	G-E	F
Tall Morningglory	F	P	F-G		F-G	F-G	
Palmer Pigweed	E	G	F ²	E	E	E	E
Pennsylvania Smartweed	P	P	E	G	P-F	F	G
Prickly Sida	P	P	E	F-G	G-E	G-E	G
Purslane	F	E	E	G	G-E	G-E	E
Showy Croton	P	P	P	G	G	G	
Sicklepod	P-F	P	F-G	G	P	F	F-G
Spurge	E	P	E	G	G	F	E
Spurred Anoda	E	N	E	F-G	G	E	
Tropic Croton	F-G	P			G	G	
Velvetleaf	F	P	E	F-G	G-E	G-E	F-G

E = >90% control G = 80-90% control F = 70-80% control P = <70% control N = No control

¹ unless Gly-Resistant ² ALS-Resistant

Table 12. Weed Response to Soybean Herbicides (cont.)

Herbicides	Aim EW	Assure II	Basagran	Classic	Cobra	Firstrate	Flexstar, Reflex, others
Application Timing	POST						
Site of Action Group	14	1	6	2	14	2	14
Weeds							
PERENNIAL WEEDS							
Bermudagrass		G–E	P	P	P	P	P
Johnsongrass (rhizome)	N	E	N	N	P	N	P
Yellow Nutsedge	N	P	F	F	P	F	F
Purple Nutsedge	N	P	P	P–F	P	P–F	P
ANNUAL GRASSES							
Barnyardgrass	N		N	N	P	N	P
Broadleaf Signalgrass	N	G	N	N	P	N	P
Crabgrass	N	F–G	N	N	P	N	P
Crowfootgrass	N	G	N	N	P	N	P
Fall Panicum	N	G	N	N	P	N	P
Goosegrass	N	F–G	N	N	P	N	P
Johnsongrass (seedling)	N	E	N	N	P	N	P
Texas Panicum	N	F–G	N	N	P	N	P
BROADLEAF WEEDS							
Balloonvine		N	G	P–F	E		G
Cocklebur	G	N	E	E	G	E	G
Coffee Senna		N	G	P	P–F		P
Common Ragweed	F	N	E	G	G	G	G
Hophorn Copperleaf		N	N	P	G	P	G
Cutleaf Groundcherry		N	F		E		E
Hemp Sesbania		N	E	G	E	P	E
Horseweed		N		F–G ²		G ²	
Jimsonweed	G	N	G	E	E	P	E
Lambsquarter	G–E	N	F	P	P–F	P	P–F
Cypressvine Morningglory		N	G–E	P	G–E	G	G–E
Entireleaf Morningglory	E	N	P	E	G	E	G
Ivyleaf Morningglory	E	N	F–G	E	G	G	G
Pitted Morningglory	E	N	F	G	E	G	E
Purple Morningglory	E	N	P	P	F–G	P–F	G–E
Red Morningglory	E	N	F–G	G–E	G–E	G	G–E
Smallflower Morningglory	P	N	F–G	G	G	E	G
Tall Morningglory	E	N	F	P–F	G	G	G
Palmer Pigweed	G–E	N	P	F ¹	G	P	G
Pennsylvania Smartweed	G	N	E	E	E		G
Prickly Sida	F	N	G	P	G	P	P
Purslane	G	N	F–G	E	E		G
Showy Croton	F	N	N		E		E
Sicklepod	P	N	N	F–G	P–F	F–G	P
Spurge		N	N	N	G	P	P–F
Spurred Anoda		N	G	P	F		P
Tropic Croton	G	N	P	P	E	F	
Velvetleaf	E	N	E	G	G	F–G	F

E = >90% control G = 80–90% control F = 70–80% control P = <70% control N = No control

¹ unless Gly–Resistant ² ALS–Resistant

Table 12. Weed Response to Soybean Herbicides (cont.)

Herbicides	Fusilade DX	Glyphosate (Various)	Liberty 280 SL	Poast Plus	Prefix	Select Max	Storm
Application Timing	POST						
Site of Action Group	1	9	10	1	14 + 15	1	6 + 14
Weeds							
PERENNIAL WEEDS							
Bermudagrass	G–E	P–F	P	F		G–E	P
Johnsongrass (rhizome)	E	G–E	P–F	G	P	E	N
Yellow Nutsedge	P	F–G	P	P	F–G	P	F
Purple Nutsedge	P	F–G	P	P		P	P
ANNUAL GRASSES							
Barnyardgrass	G	E	F–G	G	P	E	P
Broadleaf Signalgrass	E	E	G	E	P	E	P
Crabgrass	F	E	F–G	G	P	G	P
Crowfootgrass	F	E	G	F–G	P	G	P
Fall Panicum	G	E	G	G	P	G	P
Goosegrass	F–G	E	P	F–G	P	F–G	P
Johnsongrass (seedling)	G–E	E	G	G–E	P	E	P
Texas Panicum	G–E	E	G	E	P	G–E	P
BROADLEAF WEEDS							
Balloonvine	N	G	E	N	G	N	G
Cocklebur	N	E	E	N	G	N	E
Coffee Senna	N	G		N		N	G
Common Ragweed	N	G	G	N	F	N	E
Hophorn Copperleaf	N	P–F	G	N	E	N	F–G
Cutleaf Groundcherry	N	E	F	N	G	N	E
Hemp Sesbania	N	F	G–E	N	F–G	N	E
Horseweed	N	F–G ¹	G	N		N	
Jimsonweed	N	G	G	N	N	N	G
Lambsquarter	N	G	E	N	F–G	N	G
Cypressvine Morningglory	N	F	G–E	N	F	N	G–E
Entireleaf Morningglory	N	F	G–E	N	G	N	G
Ivyleaf Morningglory	N	F	G–E	N	G	N	E
Pitted Morningglory	N	P–F	G–E	N	E	N	E
Purple Morningglory	N	P–F	G	N	F	N	G
Red Morningglory	N	F	G–E	N	F	N	G
Smallflower Morningglory	N	F	G–E	N	G	N	E
Tall Morningglory	N	F	G–E	N	F	N	G
Palmer Pigweed	N	G–E ¹	F–G	N	G	N	F–G
Pennsylvania Smartweed	N	G	G–E	N	F	N	G
Prickly Sida	N	P–F	P–F	N	P	N	F–G
Purslane	N	G	G	N	E	N	G
Showy Croton	N	G		N	G	N	E
Sicklepod	N	E	G	N	E	N	P
Spurge	N	G	G	N	G	N	F
Spurred Anoda	N	F–G	F–G	N	P	N	F–G
Tropic Croton	N	G	G	N	F–G	N	G–E
Velvetleaf	N	G	E	N	E	N	G

E = >90% control G = 80–90% control F = 70–80% control P = <70% control N = No control

¹ unless Gly–Resistant ² ALS–Resistant

Table 12. Weed Response to Soybean Herbicides (cont.)

Herbicides	Synchrony XP	Ultra Blazer	Zidua	Aim EW	Glyphosate (Various)	Sharpen	Gramoxone SL, etc.
Application Timing	POST			HARVEST AID			
Site of Action Group	2 + 2	14	15	14	9	14	22
Weeds							
PERENNIAL WEEDS							
Bermudagrass		P	E	N	P-F		P
Johnsongrass (rhizome)	N	P	P	N	G-E		P
Yellow Nutsedge	F-G	P	P	N	F-G		P-F
Purple Nutsedge		P	P	N	F-G		P-F
ANNUAL GRASSES							
Barnyardgrass	G	P	E	N	E	P	E
Broadleaf Signalgrass	G	P	E	N	E	P	E
Crabgrass	G	P	E	N	E	P	E
Crowfootgrass		P	G-E	N	E	P	G
Fall Panicum	E	P	G	N	E	P	G
Goosegrass	F-G	P	G	N	E	P	G
Johnsongrass (seedling)	F	P	F-G	N	E	P	G
Texas Panicum		P	F	N	E	P	G
BROADLEAF WEEDS							
Balloonvine		G			G		P
Cocklebur	E	G	P	G	E	F	G
Coffee Senna		P-F		P	G		
Common Ragweed		E	P-F	F	G		G
Hophorn Copperleaf	F-G	G-E	G		P-F		F-G
Cutleaf Groundcherry	N	E			E		F-G
Hemp Sesbania	G	E	G		F	F	P
Horseweed					F-G ¹	G	
Jimsonweed	F-G	E	F-G	G	G		G
Lambsquarter		F		G-E	G	F-G	F-G
Cypressvine Morningglory		G-E			F	F	F
Entireleaf Morningglory	E	G	F	E	F	F	F-G
Ivyleaf Morningglory	E	G	F	E	F	F	F-G
Pitted Morningglory	E	G-E	F	E	P-F	F	F-G
Purple Morningglory		G-E		E	P-F	F	
Red Morningglory		G-E		E	F	F	F-G
Smallflower Morningglory	E	G-E	F	P	F	F	F-G
Tall Morningglory		G		E	F	F	F-G
Palmer Pigweed	G	G-E	E	G-E	G-E ¹	E	F-G
Pennsylvania Smartweed	G	G	G	G	G		P-F
Prickly Sida	F	P	G	F	P-F	F-G	P-F
Purslane	G	E	E	G	G		G
Showy Croton		E		F	G		G
Sicklepod		P-F	F-G	P	E	P-F	G
Spurge	G	F-G	E		G		P-F
Spurred Anoda		P			F-G		G
Tropic Croton		E		G	G		G
Velvetleaf	G	F	F-G	E	G		F

E =>90% control G = 80-90% control F = 70-80% control P = <70% control N = No control

¹ unless Gly-Resistant ²ALS-ResistantWeed response and control recommendations to soybean prepared by Joyce A. Tredaway, *Extension Specialist*, Department of Crop, Soil and Environmental Sciences, Auburn University.



FOR MORE INFORMATION on pesticides, pesticide safety, or submitting samples for analysis, see the following publications in the IPM series:
IPM 1293, "Safety." Safety contact information; worker protection standards; the safe use, handling, and storage of pesticides
IPM 1294, "Submitting Samples." Procedures for submitting samples for diagnosis, analysis, and identification
IPM 1295, "General Pesticide Information." Federal and state restricted use pesticide lists; pesticides and water quality
IPM 1317, "Appendix." Pesticide guidelines for agronomic crops, including preharvest intervals; rain-free requirements; grazing restrictions; crop rotation guidelines; and the names, classifications, and toxicities of pesticides.

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For more information, contact your county Extension office. Visit www.aces.edu/directory.

Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency or the Alabama Department of Agriculture and Industries. If a registration is changed or canceled, the rate listed here is no longer recommended. Before you apply **any** pesticide, check with your county Extension agent for the latest information.

Trade names are used **only** to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

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