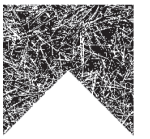
extension
ALABAMA A&M & AUBURN UNIVERSITIES

Pastures and Forage Crops

IPM



IPM-0028

Insect and Weed Control Recommendations for 2017

INSECT PEST MANAGEMENT

Check forages regularly to detect insect infestations. They should be checked frequently during the active growing season, particularly during periods of drought. Three to four locations in each field should be monitored. Symptoms of insect infestation may be early visible chewing, or it may be less obvious. Insects may be on the foliage, may hide in the crowns of the plants, or may feed on the plant roots. Look for yellowing plants and spots where the grass may be dead or thinning.

A sweep-net helps in detecting insect infestations, particularly those of grasshoppers, the various armyworms, spittlebugs, blister beetles, and leafhoppers. These nets, often made of tapered muslin bags mounted on a 12- to 15-inch rim, can be bought for $20 to $30. However, an old pillowcase mounted on a dip net makes a good substitute. If excessively large numbers of insects are detected in the sweep net, the area can then be examined more closely.

To find soil insects, check areas with poor growth or where soil surface has been disturbed. Use a shovel to dig or turn soil 8 inches deep. In late August, scout pastures where organic fertilizers have been used for green June beetles. Common insect pests of pastures are discussed below.

See Tables 1 through 4 for chemical control recommendations. Insecticides used on summer annual forages differ from those on legumes or on perennial grasses. For forage sorghum, sudangrass, and millet, see the temporary grazing section of the Georgia Pest Management Guide at http://www.ent.uga.edu/pest-management/#commercial.

Fall Armyworm

Fall armyworm caterpillars damage crops by chewing plant tissue. They prefer to feed on plants in the grass family, i.e., turf, corn, sorghum, and grass pastures. When hungry, however, they will also attack most field crops.

There are two strains of fall armyworm: one prefers to feed on rice and pasture grasses; the other prefers corn and sorghum. When fall armyworms eat all the available food in a field, they will migrate in large numbers to other fields.

The fall armyworm moths migrate north from southern Florida, the Caribbean, and Central America each year. By early summer, they are laying eggs in Alabama pastures. Reports of damaging populations usually come in late July and early August when later generations of the pest are present. However, damaging populations can occur in June. Hot, dry weather is favorable for fall armyworm outbreaks. This insect has several generations per year. There can be considerable overlap between generations later in the season.

Fall armyworms can be found feeding on foliage at any time of day but may be less likely to be found during the hottest hours. When fully grown, they are 1.5 inches long. Fall armyworms are always striped, but their coloring is not always the same. Their background color ranges from light green to almost black. Fall armyworm caterpillars can be identified by four black dots arranged in a square on the back of the tip of the abdomen, and three white lines on the back of the segment behind the head. Larger caterpillars typically have a light-colored, upside-down Y-shape on the head. More information on biology and habits of fall armyworms can be found in Alabama Cooperative Extension Circular ANR-1019, "Management of Fall Armyworms in Pastures and Hayfields," www.aces.edu/pubs/docs/A/ANR-1019/. The publication "Identifying Caterpillars of Field and Forage Crops," www.aces.edu/pubs/docs/A/ANR-1121/, may be used to distinguish fall armyworms from other common caterpillars.

Fall armyworms need to be treated when they are still small—less than 1 inch long. Detecting infestations when the caterpillars are small gives more time for control measures to be implemented. When armyworms are fully grown, they are less susceptible to insecticides and, therefore, are harder to kill. In addition, if most of the caterpillars are nearly grown, most of the damage will already have been done. Then, there will be little benefit from control.

Because of the need to detect infestations early, check perennial grass forages frequently to see if damaging numbers of fall armyworms or other pasture pests are present. Usually, late July through October is the recommended time for scouting. Scouting is particularly important when the weather has been hot and dry.

A sweep net is very useful in finding fall armyworms while they are still small. A video on how to use a sweep net to find fall armyworms can be found at http://youtu.be/71wdf8P33bQ. Most county offices of the Alabama Cooperative Extension System have a net that you can borrow. During the summer, a map showing where fall armyworms have been found damaging forages is linked in the insect pest section of alabamaforages.com and alabamabeefsystems.com.

Walk into the pasture from all four sides or walk in an X across the field to make sure you check a large enough area. If you find armyworms with the sweep net, then inspect the grass to see how many armyworms you have per square foot. Control of fall armyworms is justified when the population exceeds two to three 0.5-inch caterpillars per square foot.

Making Control Decisions. If damaging levels of fall armyworm are found and fields are almost ready to mow for hay, consider mowing earlier than usual. Insecticides are recommended if only part of a pasture is infested (treat the infested area only) or if the grass is too short to be cut for hay. If considerable defoliation has already occurred, consider grazing or mowing whatever forage is left. If rain is forecast and it is not too late in the season, bermudagrass pastures can be fertilized to encourage another hay crop. Each generation of fall armyworms takes about 1 month under Alabama conditions. If a hay crop is lost to the insect, the next hay crop should be checked frequently, particularly in the time frame of 2 to 5 weeks from the time injury was noticed.

Fall armyworms can destroy a hay crop in bermudagrass and bahiagrass pastures, but they will rarely cause plant death. However, defoliation by fall armyworm, particularly in drought-stressed conditions, can kill the fescue plants.

Chemical control recommendations for fall armyworm in grass pastures are included in this guide. Pay careful attention to the grazing interval—the time required from application until livestock can be put back in a pasture.

If the efficacy of a chemical is in doubt, treat a small test area. The next day, check for control percentage.

Green June Beetles (Grubworms) and Other White Grubs

Four types of grubs are common in grass pastures. They are the larval stages of green June beetles (Junebugs), May beetles in the genus *Phyllophaga,* southern masked chafers, and Japanese beetles. Grubs in the genus *Polyphylla* have also been found to damage pasture grasses.

The green June beetle is an increasing problem in Alabama. The grubs of this beetle rarely feed on grass roots, but their extensive burrowing activities disrupt the root-soil contact. Once the soil around the roots is loosened, grazing cattle can easily uproot the plants. When green June beetle grubs are present, the pasture will seem to have thinned out. There will be areas where the soil is pulverized, and you may see 0.5-inch-diameter tunnels that the grubs have made. The green June beetle grub is stout, it has short legs, and it crawls on its back. This distinguishes it from other white grubs which have longer legs and typically curl up into a C-shape when disturbed. Grubs typically come to the surface at night to feed on organic matter.

Green June beetles have one generation per year. The green and gold adults fly in the daytime and are a familiar sight in July and August. Eggs hatch in August to early September. Best time to spray is in September and early October. They grow to be 2 inches long by late fall or early spring.

Pastures in high-risk areas should be checked for green June beetle grubs. ***High-risk pastures are those in which broiler litter or manure has been applied as fertilizer.*** This is particularly important if winter forages will be overseeded. The tunneling activities can tear up young plants. Green June beetle grubs tend to move along a drill row, pushing out seedlings as they go. The best way to scout for green June beetles is to look for tunneling holes, pulverized soil, or thin areas in pastures. Then, use a shovel to carefully dig out a square-foot surface area to a depth of 8 to 10 inches. Sift the soil carefully, looking for the grubs. Check at least five samples per field. Treat fescue with an insecticide (see Table 1) if more than two to four grubs per square foot are found. Bermudagrass should be treated if four to six grubs per square foot are found. Fields where winter annuals are planted should be treated if more than one green June beetle grub per square foot is found. See Extension Circular ANR-991, "Biology and Control of the Green June Beetle," www.aces.edu/pubs/docs/A/ANR-0991, for more details on green June beetle biology.

The other white grubs feed on the roots of pasture grasses. They can prune the roots so intensively that the pasture sod can be rolled back like a carpet. In some years, pastures may not recover from this severe pruning.

Smaller populations of grubs can reduce plant stand, allowing invasion by broadleaf weeds. The broadleaf weeds, in turn, make it easier for the adult females to get down to the soil to lay eggs, causing further damage to sod.

White grubs occur in mixed populations. It is rare that an infestation consists of a single species. If all species had similar life cycles, feeding impact, and response to insecticides, management decisions could be made without identifying species. However, this is not the case. Currently, there are no insecticides registered on pastures that are effective against May beetles, Japanese beetles, and southern masked chafers. Cultural practices to promote vigorous growth can help the grass sod recover. Weed control may be necessary for 1 to 2 years after damage has occurred.

Japanese beetles, southern masked chafers, and green June beetles have a single-year life cycle and their larvae are most damaging in late summer and fall. May beetles have 1- to 3-year life cycles, and their larvae are actively feeding except during the coolest months of the year.

Sugarcane Beetles

Sugarcane beetle adults can also damage perennial grass forages. Damage from sugarcane beetle adults is most likely to occur in May and June. Sugarcane beetles tend to feed at the base of the stems, removing enough tissue to kill the stems. They may hide in the leaf litter during the heat of the day. High rates of a pyrethroid insecticide might provide helpful control, but research data are lacking. Grubs of this species live in the soil and feed predominantly on organic matter. Bahiagrass is most likely to be damaged, particularly if it is low in pH or in a low-lying area.

Billbugs

Billbugs, *Sphenophorus coesifrons,* can cause severe damage to bahiagrass stands. Young billbug larvae tunnel inside the rhizomes beginning in midsummer. Some time in late fall they leave the rhizome and enter the soil. There they overwinter and may also feed on the roots. In April the billbugs pupate. In May and June, adults emerge to cause a second round of damage. Adults gouge elongated holes in the base of the bahiagrass stems as they feed. They lay eggs in these holes; when the eggs hatch, the life cycle begins again. Plant death seems to occur at two times of year: during adult feeding in May and June and again in late summer and early fall as the larvae feed. Billbugs do not fly readily so the damage from this pest starts in spots that enlarge each year as the new adults emerge and crawl a short distance outward from the dead spot to feed and lay eggs on the healthy plants. It is easy to miss the first infestation and all too often billbugs are detected only when a stand of bahiagrass has disappeared.

Pitfall traps can be used to detect when adults begin to emerge. Traps should be placed in healthy bahiagrass near the

edges of a dead spot in the field. Traps should be put out in mid-May and checked weekly. Once the first adults are found, traps should be checked twice a week. After the first catches, there will be a sampling date when the number of billbugs in the traps suddenly increases. This is a signal that it is time to spray to kill the billbug adults. Experience by some Alabama cattlemen has shown carbaryl (Sevin) is effective. High rates of the pyrethroid insecticides may also be helpful.

Adult billbugs are about 1/4 inch long, dark gray to black in color with long snouts typical of the weevil family. Larvae are cream colored with a medium brown colored head. They have no legs so can be distinguished easily from white grubs.

More information on this billbug can be found in the Timely Information Sheet, Scouting for Billbug Adults in Bahiagrass, https://sites.aces.edu/group/timelyinfo/Lists/Posts/Post.aspx?ID=725.

Two-lined Spittlebugs

Two-lined spittlebugs can damage bermudagrass pastures. Spittlebugs have two generations per year in Alabama. Two-lined spittlebugs overwinter as eggs in sheltered places, such as in plant debris on the soil surface, in hollow stems, and behind leaf sheaths. Humid conditions are required for egg hatch and development of young spittlebugs.

The adult is dark brown, about 0.375-inch long, with two horizontal red lines on its back. Young spittlebugs hide inside foamy masses of saliva. Nymphs and adults feed by sucking juices from the roots, stems, and leaves of bermudagrass. In heavy infestations, injured grasses tend to yellow and dry out. Damage occurs most frequently in dense, overgrown stands of bermudagrass. Populations of more than one adult spittlebug per square foot could present a problem.

Recommended control measures are to burn the affected areas to destroy the spittlebugs and the accumulated thatch. If burning is not possible, mow the pastures and then rake to reduce the amount of the accumulated thatch.

In fields where spittlebugs are a chronic problem or in fields with a heavy thatch build-up, burning in February may be used as a preventive measure.

Chinch Bugs

Chinch bugs can be a severe pest of dallisgrass and summer grass forages. Problems are enhanced by minimum tillage rotations that plant summer annual grasses after a winter grain crop and by dry, hot weather. Chinch bugs suck plant juices out of the base of plants. Symptoms include brittle stems, reddening, or sudden wilting or browning.

Many times, chinch bugs cease to be a problem after a heavy rain. If drought conditions persist, apply insecticide in a spray directed at the base of the plants. It is hard to control chinch bugs once populations are very high. Careful scouting can find the infestations early in the season when the chinch bugs are easier to control.

Fire Ants

The red imported fire ant, *Solenopsis invicta,* was accidentally introduced into Mobile sometime between 1933 and 1945 and is the predominant fire ant species in Alabama. In northwest Alabama, the black imported fire ant, *Solenopsis richteri,* is also present. Part of the state is infested with a hybrid of the two species. Imported fire ants are predators and scavengers and feed on a wide variety of foods. Their mounds are a familiar sight in Alabama pastures.

The impact of fire ants in pastures is hard to document because they affect different areas of the livestock operation. They injure both cattle and humans, and they also damage haying equipment, electrical equipment, and livestock feed. Insecticide-based management strategies have been quite effective for home lawns, golf courses, and other public areas. Controlling fire ants in livestock pastures, however, is more difficult because of the extensive land area involved, the high cost of insecticides, and because of livestock safety considerations. The publication "Management of Imported Fire Ants in Cattle Production Systems" contains more information about fire ants. You can find this publication on the imported fire ant eXtension site articles.extension.org/fire+ants.

Currently, management options for fire ants in pastures and hayfields are cultural and chemical control. In hayfields, frequent mowing discourages the building of large mounds even though fire ants will still be present. Disc mowers are more practical than conventional sickle-bar mowers because they are less likely to break.

Chemical treatment for fire ants is possible but may not be economical in pasture situations. It may be prudent to treat pastures in which heavy calving activity will occur between March and September when fire ants are most active. It may also be prudent to treat hayfields and areas around equipment sheds.

Fire ants are territorial, and defensive actions tend to limit the number of mounds per acre. Chemical treatment for fire ants has to be a continuous process. Treatments control what is already there but cannot prevent reinfestation by incoming flights of queens.

Currently, the most economical treatment for pastures is to broadcast an insecticide-laced bait that will be picked up by the foraging ants and carried back to each colony. Broadcast applications of baits are better than individual mound treatments for pastures because the visible mounds are only the tip of the iceberg. There are other colonies that have not yet built mounds. Mound treatments may be useful follow-ups a few weeks after bait has been applied.

When a bait is broadcast, it will be picked up and carried back to all of the colonies, no matter how large or how small they are. Because baits must be carried back to the nest, they must be applied when ants are actually foraging. Winter applications will not be effective. In warm weather, morning or late afternoon treatments (70° to 90°F) are best because of high foraging activity. Few ants forage during the noon heat of a summer day. Baits should be applied when the foliage is dry. Rain immediately following application will reduce efficacy. Baits are most effective when applied between May and September.

There are two kinds of fire ant baits in pastures and hayfields: fast-acting baits containing hydramethylnon and slower-acting baits containing insect growth regulators such as methoprene or pyriproxyfen. Fast-acting baits act within 2 to 4 weeks, but the effect wears off fairly quickly (3 to 8 months). Insect growth regulator baits take longer to work (4 to 8 weeks) but tend to give longer lasting control (8 to 12 months). Trials in Texas showed that mixing 0.75 pound of a metabolic inhibitor bait with 0.75 pound of an insect growth regulator bait worked faster than an insect growth regulator alone.

It also lasted longer than a metabolic inhibitor alone. A commercially available product contains a mixture of the two baits (See Table 1).

Winter Grain Mites

Winter grain mites (*Penthaleus major*) are large, dark brown or black mites with red legs. They attack fall-seeded ryegrass planted into established bermudagrass or bahiagrass sod. Damage often appears between Thanksgiving and Christmas. See "Winter Grain Mite," http://pubs.ext.vt.edu/444/444-037/444-037.html.

Bermudagrass Stem Maggot

Bermudagrass stem maggot, *Atherigona reversura,* has recently invaded Alabama. This tiny fly attacks only bermudagrass. It was first discovered in Georgia in 2010. By late summer 2012 the fly was present throughout most of Alabama. The species is native to Asia. Adult flies lay eggs on bermudagrass stems. Larvae hatch and begin feeding at a node. The feeding activity kills the portion of the plant above the node. Therefore, from a distance the primary symptom of infestation is a silvery appearance or frosted look due to the discolored dead tips. Closer inspection will show the maggots. Adult flies may be very numerous, especially toward the end of the summer. Generation time is short, about 3 weeks, so there are multiple generations each year. Finer textured bermudagrass, such as 'Alicia' appears to have more damage than coarser textured varieties such as 'Tifton 85.'

Economic thresholds for this pest are yet to be determined. Bermudagrass fields in south Alabama will be at the greatest risk of having economic damage. If a field is severely damaged, the best recourse is to harvest the field to salvage what hay is present; then apply pyrethroid insecticide on the regrowth about 10 days after harvest. For more information, see Alabama Extension publication ANR-1462, "Biology and Management of Bermudagrass Stem Maggot," www.aces.edu/pubs/docs/A/ANR-1462/ANR-1462.pdf.

Striped Ground Crickets

Striped ground crickets attack clover planted into grass sod. See ACES Circular ANR-1133, "Controlling Insect Pests During Stand Establishment of Forage Legumes" www.aces.edu/pubs/docs/A/ANR-1133, for more information.

Clover Head Weevil

Clover head weevils are the most serious pests of crimson clover grown for seed. Larvae feed on developing seeds, destroying the germ. Controlling these pests is usually necessary to get acceptable seed yields.

One option is to scout fields for adult clover leaf beetles about two weeks before bloom. Applying a recommended pesticide at that time may reduce the number of eggs laid on the heads. Another strategy is to wait until 10- to 20-percent of the seed heads are infested. Insecticides effective on weevils are also highly toxic to pollinating insects; treat fields late in the evening after bees are less active.

Organic Insecticides That Can be Applied to Perennial Grasses and Clover

Organic producers may want to consider the following insecticides, which are OMRI approved. Be sure to read the insecticide label to make sure it meets your needs. The following products contain azadirachtin: Azatrol EC, Azera, Neemix 4.5, and Ecozin Plus. Grandevo contains *Chromobacterium subtsugae* strain PRAA4-1. The following products contain *Bacillus thuringiensis*: Biobit HP (subsp. *kurstaki* strain ABTS-351), Dipel DF (subsp. *kurstaki* strain ABTS-351), Javelin WG (subsp. *kurstaki* strain SA-11), and Xentari (subsp. aizawai strain ABTS-1857). Mycotrol FS0 contains *Beauveria bassiana* strain GHA. PyGanic Crop Protection EC 1.4_{II} and PyGanic Crop Protection EC 5.0_{II} insecticides are OMRI approved and contain natural pyrethrins. There are other insecticides that contain pyrethrins. Be sure to choose one that does not contain piperonyl butoxide, as that chemical is not considered organic. Entrust and Entrust SC contain spinosad. Pest Out contains cottonseed, clove, and garlic oils. Biolink Insect and Bug Repellant contains garlic. Other organic insecticides may be available.

Table 1. Forage Grass Insect Control [1,2]

Insecticide and Formulation	Acres per Gallon	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Comments
ARMYWORM, FALL ARMYWORM, STRIPED GRASS LOOPER					
beta-cyfluthrin BAYTHROID XL	46–80	1.6–2.8 fl.oz.	0.013–0.022	0	For first and second instar armyworms. Use higher rates (2.6 to 2.8 fluid ounces) for fall armyworms. Baythroid XL is a **RESTRICTED USE** pesticide.
carbaryl SEVIN XLR PLUS Other trade names [3]	3–4	1–1.5 qt.	1–1.5	14	Treat when there are three or more 0.5-inch-long worms per square foot.
chlorantraniliprole PREVATHON Other trade names [3]	6–9	14–20 fl.oz.	0.047–0.067	0	

[1] For forage sorghum, see www.ent.uga.edu/pest-management/#commercial.
[2] See Table 2 for a list of insecticides, formulations, restricted entry intervals, days to grazing or harvest, and maximum amount to apply.
[3] See Table 2 for other trade names. NOTE: Read manufacturer's label carefully for specific information on all product use restrictions and safety.

Table 1. Forage Grass Insect Control [1,2] (cont.)

Insecticide and Formulation	Acres per Gallon	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Comments
ARMYWORM, FALL ARMYWORM, STRIPED GRASS LOOPER (cont.)					
cyfluthrin TOMBSTONE Other trade names [3]	46–80	1.6–2.8 fl.oz.	0.025–0.44	0	Tombstone is a **RESTRICTED USE** pesticide for first and second instar armyworms. Use 2.6 to 2.8 fluid ounces for fall armyworms.
diflubenzuron DIMILIN 2L	64	2 fl.oz.	0.03	1 (h), not specified (g)	Diflubenzuron is an insect growth regulator that interferes with the normal molting process. It must be eaten by the young caterpillar. Use at first sign of hatch out and before larvae are 0.5 inch long. Effects are seen when caterpillars have molted at least once. Caterpillars die when they try to molt to the next size. Dimilin is a **RESTRICTED USE** pesticide.
gamma-cyhalothrin DECLARE	83–125	1.02–1.54 fl.oz.	0.01–0.015	7 (hay), 0 (g)	Declare is a **RESTRICTED USE** pesticide.
lambda-cyhalothrin WARRIOR II WITH ZEON TECHNOLOGY Other trade names [3]	67–100	1.28–1.92 fl.oz.	0.02–0.03	7 (hay), 0 (g)	Warrior II is a **RESTRICTED USE** pesticide.
lambda-cyhalothrin + chlorantraniliprole BESIEGE	13–21	6–10 fl.oz.	0.02–0.03 + 0.04–0.06	7 (hay), 0 (g)	Besiege is a **RESTRICTED USE** pesticide.
methomyl LANNATE LV 2.4 Other trade names [3]	3–11	0.75–3 pt.	0.22–0.9	3 (hay), 7 (g)	Use higher rate for heavy populations and larger larvae. Use lower rate for small larvae. FOR BERMUDAGRASS ONLY. Lannate is a **RESTRICTED USE** pesticide.
methoxyfenozide INTREPID 2F	8–32	4–8 fl.oz.	0.06–0.12	7 (hay), 0 (g)	Use a higher rate for heavier infestations or where thorough coverage is difficult.
spinosad BLACKHAWK Other trade names [3]	2, 6–5.3 per pound	1.1–2.2 oz.	0.024–0.05	3 (h), 0 (g)	Target small larvae or eggs at hatching. Do not allow cattle to graze until foliage has dried.
zeta-cypermethrin MUSTANG MAXX INSECTICIDE	32–46	2.8–4.0 fl.oz	0.017–0.025	0	Mustang Maxx is a **RESTRICTED USE** pesticide. Graze when spray is dry.

[1] For forage sorghum, see www.ent.uga.edu/pest-management/#commercial.
[2] See Table 2 for a list of insecticides, formulations, restricted entry intervals, days to grazing or harvest, and maximum amount to apply.
[3] See Table 2 for other trade names. NOTE: Read manufacturer's label carefully for specific information on all product use restrictions and safety.

Table 1. Forage Grass Insect Control [1,2] (cont.)

Insecticide and Formulation	Acres per Gallon	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Comments
BERMUDAGRASS STEM MAGGOT					
beta-cyfluthrin BAYTHROID XL	46–80	1.6–2.8 fl.oz.	0.013–0.022	0	Baythroid XL is a **RESTRICTED USE** pesticide.
cyfluthrin TOMBSTONE Other trade names [3]	46–49	2.6–2.8 fl.oz.	0.041–0.044	0	Tombstone is a **RESTRICTED USE** pesticide.
gamma-cyhalothrin DECLARE	83–125	1.02–1.54 fl.oz.	0.01–0.015	7 (hay), 0 (g)	Declare is a **RESTRICTED USE** pesticide.
lambda-cyhalothrin WARRIOR II WITH ZEON TECHNOLOGY Other trade names [3]	67–100	1.28–1.92 fl.oz.	0.02–0.03	7 (hay), 0 (g)	Warrior II is a **RESTRICTED USE** pesticide.
zeta-cypermethrin MUSTANG MAXX INSECTICIDE	32–46	2.8–4.0 fl.oz	0.017–0.025	0	Mustang Maxx is a **RESTRICTED USE** pesticide. Graze when spray is dry.
BILLBUGS					
See section in the text at the beginning of this IPM guide.					
CHINCH BUGS					
beta-cyfluthrin BAYTHROID XL	46–49	2.6–2.8 fl.oz.	0.02–0.022	0	Baythroid XL is a **RESTRICTED USE** pesticide.
carbaryl SEVIN XLR PLUS Other trade names [3]	3–4	1–1.5 qt.	1–1.5	14	Direct spray at base of plants. Use at least 20 to 30 gallons of water per acre.
gamma-cyhalothrin DECLARE	83–125	1.02–1.54 fl.oz.	0.01–0.015	7 (hay), 0 (g)	Declare is a **RESTRICTED USE** pesticide.
lambda-cyhalothrin WARRIOR II WITH ZEON TECHNOLOGY Other trade names [3]	67–100	1.28–1.92 fl.oz.	0.02–0.03	7 (hay), 0 (g)	Under heavy population pressure and/or migration, Karate may provide suppression only. Karate is a **RESTRICTED USE** pesticide.
lambda-cyhalothrin + chlorantraniliprole BESIEGE	13–21	6–10 fl.oz.	0.02–0.03 + 0.04–0.06	7 (hay), 0 (g)	Besiege is a **RESTRICTED USE** pesticide.
zeta-cypermethrin MUSTANG MAXX INSECTICIDE	32–46	2.8–4.0 fl.oz	0.017–0.025	0	Mustang Maxx is a **RESTRICTED USE** pesticide. Graze when spray is dry.

[1] For forage sorghum, see www.ent.uga.edu/pest-management/#commercial.
[2] See Table 2 for a list of insecticides, formulations, restricted entry intervals, days to grazing or harvest, and maximum amount to apply.
[3] See Table 2 for other trade names. NOTE: Read manufacturer's label carefully for specific information on all product use restrictions and safety.

Table 1. Forage Grass Insect Control [1,2] (cont.)

Insecticide and Formulation	Acres per Gallon	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Comments
GRASSHOPPERS .					
General Comments: *Apply pesticide when 50 percent or more foliage has been lost. It may be possible to spot-treat the edge of fields. Large, black and yellow lubber grasshoppers will probably not be controlled with any insecticide*					
beta-cyfluthrin BAYTHROID XL	46–49	2.6–2.8 fl.oz.	0.02–0.022	0	Baythroid XL is a **RESTRICTED USE** pesticide.
carbaryl SEVIN XLR PLUS Other trade names [3]	3–7	0.5–1.5 qt.	0.5–1.5	14	Apply 0.5 to 0.75 pounds active ingredient per acre for nymphs or small plants. Apply 1.0 to 1.5 active ingredient per acre for mature grasshoppers or application to dense foliage or if extended residual control is desired.
cyfluthrin TOMBSTONE Other trade names [3]	46–49	2.6–2.8 fl.oz.	0.041–0.044	0	Tombstone is a **RESTRICTED USE** pesticide.
diflubenzuron DIMILIN 2L	64–128	1–2 fl.oz.	0.015–0.03	1 (h), not specified (g)	Diflubenzuron is an insect growth regulator that interferes with the normal molting process. It must be eaten by the young grasshopper. Dimilin is a **RESTRICTED USE** pesticide.
gamma-cyhalothrin DECLARE	83–125	1.02–1.54 fl.oz.	0.01–0.015	7 (hay), 0 (g)	Declare is a **RESTRICTED USE** pesticide.
lambda-cyhalothrin WARRIOR II WITH ZEON TECHNOLOGY Other trade names [3]	67–100	1.28–1.92 fl.oz.	0.02–0.03	7 (hay), 0 (g)	Warrior II is a **RESTRICTED USE** pesticide.
lambda-cyhalothrin + chlorantraniliprole BESIEGE	13–21	6–10 fl.oz.	0.02–0.03 + 0.04–0.06	7 (hay), 0 (g)	Besiege is a **RESTRICTED USE** pesticide.
malathion MALATHION 5 Other trade names [3]	4	2 pt.	1.25	0	Treat areas where young hoppers congregate before they reach the winged stage.
zeta-cypermethrin MUSTANG MAXX INSECTICIDE	32–46	2.8–4.0 fl.oz	0.017–0.025	0	Mustang Maxx is a **RESTRICTED USE** pesticide. Graze when spray is dry.
GREEN JUNE BEETLE GRUBS					
carbaryl SEVIN XLR PLUS Other trade names[3]	3–4	1–1.5 qt.	1–1.5	14	Good control for green June beetle grubs **ONLY**. Use in at least 25 gallons of water per acre. Mow or graze to reduce height of forage before application. Effectiveness depends on getting carbaryl on the soil, not the foliage.

[1] For forage sorghum, see www.ent.uga.edu/pest-management/#commercial.
[2] See Table 2 for a list of insecticides, formulations, restricted entry intervals, days to grazing or harvest, and maximum amount to apply.
[3] See Table 2 for other trade names. NOTE: Read manufacturer's label carefully for specific information on all product use restrictions and safety.

Table 1. Forage Grass Insect Control [1,2] (cont.)

Insecticide and Formulation	Acres per Gallon	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Comments
IMPORTED FIRE ANTS					
Baits on Active Pastures and Hayfields					
See discussion for mixing baits for fire ants, under "Chemical Control Options," to optimize speed and longevity of control.					
hydramethylnon AMDRO PRO FIRE ANT BAIT	—	1–1.5 lb.	0.12–0.18 oz.	7 (hay), 0 (g)	Broadcast bait uniformly. Treat when ants are foraging and when rain is not forecast for 24 hours. Or treat the mound by applying 2 to 5 level tablespoons per mound, distributing material 3 to 4 feet around the mound.
pyriproxyfen ESTEEM ANT BAIT	—	1.5–2 lb.	0.12–0.16 oz.	0 (g)	Apply uniformly when ants are looking for food. Avoid application if rain is expected within 4 to 6 hours. Or apply as a mound treatment by sprinkling 2 to 4 level tablespoons around the mound. Noticeable results may take 4 to 8 weeks.
s-methoprene EXTINGUISH PROFESSIONAL FIRE ANT BAIT	—	1–1.5 lb.	0.08–0.12 oz.	0	Extinguish is labeled for use in all forages. Apply as a broadcast treatment when ants are foraging and when rain is not forecast for 24 hours. Or apply as a mound treatment by sprinkling 3 to 5 tablespoons around each mound, distributing material 4 feet around the mound. Extinguish is an insect growth regulator. It may take several months to see noticeable results.
s-methoprene + hydramethylnon EXTINGUISH PLUS	—	1.5 lb.	0.06 oz. s-methoprene + 0.08 oz. hydramethyl-non	7 (harvest), 0 (g)	Do not apply more than 8 pounds per acre per year. Allow at least 90 days between applications. Apply as a broadcast treatment when ants are foraging and when rain is not forecast for 24 hours, or apply as a mound treatment 2-5 tbsp./mound.
hopper blend EXTINGUISH PROFESSIONAL FIRE ANT BAIT + another bait	—	0.75 lb. + 0.75 lb. other bait	—		Mix Extinguish Professional fire ant bait in a 50:50 mix with a hydramethylnon ant bait. Broadcast or treat the mound by applying 3 to 5 tablespoons per mound, distributing material 4 feet around the mound.

[1] For forage sorghum, see see www.ent.uga.edu/pest-management/#commercial.
[2] See Table 2 for a list of insecticides, formulations, restricted entry intervals, days to grazing or harvest, and maximum amount to apply.
[3] See Table 2 for other trade names. NOTE: Read manufacturer's label carefully for specific information on all product use restrictions and safety.

Table 1. Forage Grass Insect Control [1,2] (cont.)

Insecticide and Formulation	Acres per Gallon	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Comments
IMPORTED FIRE ANTS (cont.)					
Contact Insecticide for Individual Mound Treatment					
carbaryl SEVIN XLR PLUS Other trade names[3]	—	—	—	14	Mix 0.75 fluid ounces per gallon of water. Apply a total of 2 gallons of the diluted solution over each mound or at least 1 quart per 6 inches of mound diameter, using a bucket or watering can. Thoroughly wet mound and surrounding area, distributing material 4 feet around the mound. Do not disturb the mound prior to treatment. Pour solution from a height of about 3 feet to give sufficient force to break the mound open and flow into tunnels. For best results apply when the temperature is between 65 and 80°F. Repeat application after 7 days if mound activity resumes. Pressurized sprays may reduce the effectivenss of the treatment by disturbing the ants and causing migration.
STRIPED GROUND CRICKETS					
General Comments: *Apply an insecticide before overseeding clovers if excessive numbers of crickets (more than four or five crickets per square foot) are present.*					
beta-cyfluthrin BAYTHROID XL	46–49	2.6–2.8 fl.oz.	0.02–0.022	0	Baythroid XL is a **RESTRICTED USE** pesticide.
carbaryl SEVIN XLR PLUS Other trade names [3]	3–4	1–1.5 qt.	0.02–0.022	14	Karate Z is a **RESTRICTED USE** pesticide.
gamma-cyhalothrin DECLARE	83–125	1.02–1.54 fl.oz.	0.01–0.015	7 (hay), 0 (g)	Declare is a **RESTRICTED USE** pesticide.
lambda-cyhalothrin WARRIOR II WITH ZEON TECHNOLOGY Other trade names [3]	67–100	1.28–1.92 fl.oz.	0.02–0.03	7 (hay), 0 (g)	Warrior II is a **RESTRICTED USE** pesticide.
lambda-cyhalothrin + chlorantraniliprole BESIEGE	13–21	6–10 fl.oz.	0.02–0.03 + 0.04–0.06	7 (hay), 0 (g)	Besiege is a **RESTRICTED USE** pesticide.
zeta-cypermethrin MUSTANG MAXX INSECTICIDE	32–46	2.8–4.0 fl.oz.	0.017–0.025	0	Mustang Maxx is a **RESTRICTED USE** pesticide. Graze when spray is dry.
SUGARCANE BEETLES					
See section in the text at the beginning of this IPM guide.					

[1] For forage sorghum, see www.ent.uga.edu/pest-management/#commercial.
[2] See Table 2 for a list of insecticides, formulations, restricted entry intervals, days to grazing or harvest, and maximum amount to apply.
[3] See Table 2 for other trade names. NOTE: Read manufacturer's label carefully for specific information on all product use restrictions and safety.

Table 1. Forage Grass Insect Control [1,2] (cont.)

Insecticide and Formulation	Acres per Gallon	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Comments
TWO-LINED SPITTLEBUGS (ON COASTAL BERMUDAGRASS)					
See section in the text at the beginning of this IPM guide.					No chemical control is recommended on coastal bermudagrass. Prevent a dense mat of grass from forming by grazing or by close mowing and raking. If spittlebugs should seriously damage a dense growth, the dead grass may be burned off immediately.
WHITE GRUBS (OTHER THAN GREEN JUNE BEETLE)					
See section in the text at the beginning of this IPM guide.					No effective insecticides are labeled for control of these insects. Rotate fields to crops where preplant or at-planting insecticides can be used to control these insects.
WINTER GRAIN MITES					
The following insecticides may provide helpful control.					
lambda-cyhalothrin WARRIOR II WITH ZEON TECHNOLOGY Other trade names [3]	67–100	1.28–1.92 fl.oz.	0.02–0.03	7 (hay), 0 (g)	Warrior II is a **RESTRICTED USE** pesticide.
lambda-cyhalothrin + chlorantraniliprole BESIEGE	13–21	6–10 fl.oz.	0.02–0.03 + 0.04–0.06	7 (hay), 0 (g)	Besiege is a **RESTRICTED USE** pesticide
zeta-cypermethrin MUSTANG MAXX Other trade names [3]	32–46	2.8–4.0 fl.oz.	0.017–0.025	0	Mustang Maxx is a **RESTRICTED USE** pesticide. Graze when spray is dry.

[1] For forage sorghum, see www.ent.uga.edu/pest-management/#commercial.
[2] See Table 2 for a list of insecticides, formulations, restricted entry intervals, days to grazing or harvest, and maximum amount to apply.
[3] See Table 2 for other trade names. NOTE: Read manufacturer's label carefully for specific information on all product use restrictions and safety.

Table 2. Insecticides Labeled for Use on Perennial Grass Pasture and Hayfields

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Bee Hazard Restrictions
beta-cyfluthrin *MoA Group 3A					
BAYTHROID XL (Restricted Use)	1 lb./gal.	emulsifiable concentrate	12	0	yes[4]
carbaryl MoA Group 1A					
SEVIN 4F, others	4 lb./gal.	liquid suspension	12	14	yes[2]
SEVIN XLR PLUS, others	4 lb./gal.	liquid suspension	12	14	yes[2]
CARBARYL 4L, others	4 lb./gal.	liquid suspension	12	14	yes[2]
chlorantraniliprole MoA Group 28					
DUPONT CORAGEN	1.67 lb./gal.	suspension concentrate	4	0	no
DUPONT PREVATHON	0.43 lb./gal.	suspension concentrate	4	0	no
cyfluthrin MoA Group 3A					
TOMBSTONE (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	0	yes[1]
TOMBSTONE HELIOS (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	0	yes[1]
diflubenzuron MoA Group 15					
DIMILIN 2L	2 lb./gal.	liquid	12	1 (h), not specified (grazing)	yes[3]
DIMILIN 25W	4 oz./lb.	wettable powder	12	1 (h), not specified (grazing)	yes[3]
gamma-cyhalothrin MoA Group 3A					
DECLARE	1.25 lb./gal.	capsule suspension	24	7(h), 0(g)	yes[1]
hydramethylnon MoA Group 20A					
AMDRO PRO FIRE ANT BAIT	0.12 oz./lb	bait	12	7(h), 0(g)	no
hydramethylnon + s-methoprene MoA Group 20A + MoA Group 7A					
EXTINGUISH PLUS	0.06 oz. + 0.04 oz./lb.	bait	12	7(h), 0(g)	no

[1] This product is highly toxic to bees exposed to direct treatment or residues on blooming crop weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

[2] BEE CAUTION: Do not apply this product to target crops or weeds in bloom. This product may show residual toxicity to honeybees, especially in humid climates and under slow drying conditions. This product is highly toxic to bees exposed to direct treatment or residues on crops or weeds in bloom. Notifying beekeepers within 1 mile of treatment area at least 48 hours before product is applied will allow them to take additional steps to protect their bees. Limiting applications to times when bees are least active, e.g., within 2 hours of sunrise or sunset, will minimize risk to bees.

[3] Bees and other insect pollinators can be exposed to this pesticide from direct contact during foliar applications or contact with residues on plant surfaces after foliar applications and by ingestion of residues in nectar and pollen when the pesticide is applied as a soil or foliar application. When using this product, take steps to minimize exposure of this product to bees and other insect pollinators when they are foraging on pollinator-attractive plants around the application site, and minimize drift of this product on to beehives or off site pollinator-attractive habitat. Drift of this product onto beehives or off site to pollinator-attractive habit can result in bee kills.

[4]This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds on which bees are actively foraging. Additional information may be obtained by consulting your Cooperative Extension Service.

*MoA = Mode of Action classification from the Insecticide Resistance Action Committee (www.irac-online.org). Insecticides with different MoAs should be used for insecticide resistance management.

Table 2. Insecticides Labeled for Use on Perennial Grass Pasture and Hayfields (cont.)

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Bee Hazard Restrictions
lambda-cyhalothrin MoA Group 3A					
GRIZZLY Z INSECTICIDE **(RESTRICTED USE)**	1 lb./gal.	capsule suspension	24	7(h), 0(g)	yes[1]
WARRIOR II WITH ZEON TECHNOLOGY **(RESTRICTED USE)**	2.08 lb./gal.	capsule suspension	24	7(h), 0(g)	yes[1]
KENDO **(RESTRICTED USE)**	1 lb./gal.	emulsifiable concentrate	24	7 (hay), 0 (grazing, forage)	yes[1]
LAMBDA-CY, 1EC, EC, AG **(RESTRICTED USE)**	1 lb./gal.	emulsifiable concentrate	24	7(h), 0(g)	yes[1]
LAMBDA-CYHALOTHRIN 1EC **(RESTRICTED USE)**	1 lb./gal.	capsule suspension	24	7(h), 0(g)	yes[1]
LAMBDASTAR **(RESTRICTED USE)**	1 lb./gal.	emulsifiable concentrate	24	7(h), 0(g)	yes[1]
LAMBDASTAR 1CS **(RESTRICTED USE)**	1 lb./gal.	capsule suspension	24	7(h), 0(g)	yes[1]
LAMBDASTAR PLUS **(RESTRICTED USE)**	2 lb./gal.	capsule suspension	24	7(h), 0(g)	yes[1]
LAMBDA-T **(RESTRICTED USE)**	1 lb./gal.	capsule suspension	24	7(h), 0(g)	yes[1]
LAMCAP **(RESTRICTED USE)**	1 lb./gal.	capsule suspension	24	7(h), 0(g)	yes[1]
PARADIGM **(RESTRICTED USE)**	1 lb./gal.	capsule suspension	24	7(h), 0(g)	yes[1]
PROVINCE **(RESTRICTED USE)**	1 lb./gal.	capsule suspension	24	7(h), 0(g)	yes[1]
RAVAGE **(RESTRICTED USE)**	1 lb./gal.	emulsifiable concentrate	24	7 (hay), 0 (grazing, forage)	no
SILENCER **(RESTRICTED USE)**	1 lb./gal.	emulsifiable concentrate	24	7(h), 0(g)	yes[1]
SILENCER VXN **(RESTRICTED USE)**	1 lb./gal.	capsule suspension	24	7 (hay), 0 (g)	yes[1]
PROVINCE II **(RESTRICTED USE)**	2.08 lb./gal.	capsule suspension	24	7 (hay), 0 (g)	yes[1]
GRIZZLY TOO **(RESTRICTED USE)**	2.08 lb./gal.	capsule suspension	24	7 (hay), 0 (g)	yes[1]

[1] This product is highly toxic to bees exposed to direct treatment or residues on blooming crop weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

Table 2. Insecticides Labeled for Use on Perennial Grass Pasture and Hayfields (cont.)

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Bee Hazard Restrictions
lambda-cyhalothrin + chlorantraniliprole MoA Group 3A + MoA Group 28					
BESIEGE **(RESTRICTED USE)**	0.42 lb./gal. + 0.83 lb./ gal.	capsule, suspension + soluble concentrate	24	7 (h), 0 (g)	yes[1]
malathion MoA Group 1B					
MALATHION 5, 5E, 57EC, others	5 lb./gal.	emulsifiable concentrate	12	0	yes[1]
GOWAN MALATHION 8, others	8 lb./gal.	emulsifiable concentrate	12	0	yes[1]
CHEMINOVA MALATHION 57%	5 lb./gal.	emulsifiable concentrate	12	0	yes[1]
FYFANON Malathion Insecticide	5 lb./gal.	emulsifiable concentrate	12	0	yes[1]
FYFANON ULV AG	9.9 lb./gal.	emulsifiable concentrate	12	0	yes[1]
FYFANON 8 LB EMULSION	8 lb./gal.	emulsifiable concentrate	12	0	yes[1]
methomyl (bermudagrass only) MoA Group 1A					
ANNIHILATE LV **(RESTRICTED USE)**	2.4 lb./gal.	Water soluble liquid	48	7 (g), 3 (h)	yes[1]
ANNIHILATE SP **(RESTRICTED USE)**	14.4 oz./lb.	Water soluble powder	48	7 (g), 3 (h)	yes[1]
CORRIDA 29 SL **(RESTRICTED USE)**	2.4 lb./gal.	Water soluble liquid	48	7 (g), 3 (h)	yes[1]
CORRIDA 90 WSP **(RESTRICTED USE)**	14.4 oz./lb.	water soluble bags	48	3 (h), 7 (g)	yes[1]
DUPONT LANNATE LV **(RESTRICTED USE)**	2.4 lb./gal.	water soluble liquid	48	3 (h), 7(g)	yes[1]
DUPONT LANNATE SP **(Restricted Use)**	14.4 oz./lb.	water soluble powder	48	3 (h), 7(g)	yes[1]
NUDRIN LV **(RESTRICTED USE)**	2.4 lb./gal.	water soluble liquid	48	3 (h), 7(g)	yes[1]
NUDRIN SP **(RESTRICTED USE)**	14.4 oz./lb.	water soluble packet	48	3 (h), 7(g)	yes[1]
methoxyfenozide MoA Group 18					
INTREPID 2F	2 lb./gal.	flowable liquid	4	7 (h), 0(g)	no
TROUBADOUR 2F	2 lb./gal.	flowable liquid	4	7 (h), 0 (g)	no
pyriproxyfen MoA Group 7D					
ESTEEM ANT BAIT	0.08 oz./lb.	bait	12	0 (g)	no
s-methoprene MoA Group 7A					
EXTINGUISH PROFES-SIONAL FIRE ANT BAIT	0.08 oz./lb.	bait	4	0	no

[1] This product is highly toxic to bees exposed to direct treatment or residues on blooming crop weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

Table 2. Insecticides Labeled for Use on Perennial Grass Pasture and Hayfields (cont.)

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Bee Hazard Restrictions
spinosad MoA Group 5					
BLACKHAWK	5.8 oz./lb.	wettable powder	4	3 (h), 0 (g)	yes[4]
ENTRUST	12.8 oz./lb.	wettable powder	4	Same as above	yes[4]
ENTRUST SC	2 lb./gal.	soluble concentrate	4	Same as above	yes[4]
zeta-cypermethrin MoA Group 3A					
MUSTANG MAXX INSECTICIDE	0.8 lb./gal.	emulsifiable concentrate	12	0 (forage, hay) Graze when spray is dry.	yes[1]

[1] This product is highly toxic to bees exposed to direct treatment or residues on blooming crop weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.
[4] This product is toxic to bees exposed to treatment during the 3 hours following treatment. Do not apply to blooming, pollen-shedding, or nectar-producing parts of plants if bees may forage during this time period.

Table 3. Clover Insect Control [1,2]

Insecticide and Formulation	Acres per Gallon	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Comments
ALFALFA WEEVILS					
carbaryl SEVIN XLR PLUS Other trade names [3]	3	1.5 qt.	1.5	7	Observe bee caution. If pretreatment damage is extensive, cut clover and treat the stubble. To avoid plant injury to tender foliage.
zeta-cypermethrin MUSTANG MAXX INSECTICIDE Other trade names [3]	32–57	2.2–4.0 fl.oz.	0.014–0.025	3 (h,g) 7 (seed)	Mustang Maxx is a **RESTRICTED USE** pesticide.
APHIDS					
malathion MALATHION 5 Other trade names [3]	4–5	1.5–2 pt.	0.93–1.25	0	Treat when one aphid per plant is found on seedlings or when honeydew is found on older stands. Avoid treating crops grown for seed with these insecticides when pollinating insects are visiting blooms.
zeta-cypermethrin MUSTANG MAXX INSECTICIDE Other trade names [3]	32–57	2.2–4.0 fl.oz.	0.014–0.025	3 (h,g) 7 (seed)	Mustang Maxx is a **RESTRICTED USE** pesticide. Control may be variable depending on species of aphid.
ARMYWORMS					
carbaryl SEVIN XLR PLUS Other trade names [3]	3–4	1–1.5 qt.	1–1.5	7	

[1] See the Alfalfa IPM for insect control on alfalfa stands.
[2] See Table 4 for a list of insecticides, formulations, restricted entry intervals, days to grazing or harvest, and maximum amount to apply.
[3] See Table 4 for other trade names.

Table 3. Clover Insect Control [1,2] (cont.)

Insecticide and Formulation	Acres per Gallon	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Comments
ARMYWORMS (cont.)					
chlorantraniliprole PREVATHON Other trade names [3]	6–9	14–20 fl.oz.	0.047–0.007	0	
methoxyfenozide INTREPID 2F	16–32	4–8 fl.oz.	0.06–0.12	7 (h), 0 (g)	
spinosad ENTRUST SC	32–64	2–4 fl.oz.	0.03–0.06	3 (h), 0 (g)	
zeta-cypermethrin MUSTANG MAXX INSECTICIDE Other trade names [3]	32–46	2.8–4.0 fl.oz.	0.0175–0.025	3 (h,g) 7 (seed)	Mustang Maxx is a **RESTRICTED USE** pesticide.
BLISTER BEETLES					
carbaryl SEVIN XLR PLUS Other trade names [3]	4–8	0.5–1 qt.	0.5–1	7	
CLOVER HEAD WEEVILS					
carbaryl SEVIN XLR PLUS Other trade names [3]	3–4	1–1.5 qt.	1–1.5	7	Treat when 10 to 20 percent of seed heads are infested with larvae. Bee hazard; avoid treating crops when pollinating insects are active.
CLOVER LEAF WEEVILS, LESSER CLOVER LEAF WEEVILS					
carbaryl SEVIN XLR PLUS Other trade names [3]	3–4	1–1.5 qt.	1–1.5	7	Apply when foliage feeding becomes severe. Avoid treating crops when pollinating insects are active.
GREEN CLOVERWORMS					
carbaryl SEVIN XLR PLUS Other trade names [3]	4	1 qt.	1	7	Treat when worm population and foliage loss indicate control is needed.
methoxyfenozide INTREPID 2F	16–32	4–8 fl.oz.	0.06–0.12	7 (h), 0 (g)	
zeta-cypermethrin MUSTANG MAXX INSECTICIDE	32–57	2.2–4.0 fl.oz.	0.014–0.025	3 (h,g) 7 (seed)	Mustang Maxx is a **RESTRICTED USE** pesticide.
IMPORTED FIRE ANTS					
s-methoprene EXTINGUISH PROFESSIONAL FIRE ANT BAIT	—	1–1.5 lb.	0.08–0.12	0	Apply uniformly when ants are looking for food. Avoid application if rain is expected within 4 to 6 hours. Or apply as a mound treatment by sprinkling 2 to 4 tablespoons around the mound.

[1] See the Alfalfa IPM for insect control on alfalfa stands.
[2] See Table 4 for a list of insecticides, formulations, restricted entry intervals, days to grazing or harvest, and maximum amount to apply.
[3] See Table 4 for other trade names.

Table 3. Clover Insect Control [1,2] (cont.)

Insecticide and Formulation	Acres per Gallon	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest (h) or Grazing (g)	Comments
PLANT BUGS (LYGUS SPECIES)					
carbaryl SEVIN XLR PLUS Other trade names [3]	3–4	1–1.5 qt.	1–1.5	7	Apply insecticide as soon as buds appear or in early bloom if seed yield is important and if plant bugs appear in large numbers. **DO NOT** apply insecticide when honey bees are present.
malathion MALATHION 5 Other trade names [3]	4–5	1.5–2 pt.	0.93–1.25	0	Apply insecticide as soon as buds appear or in early bloom if seed yield is important and if plant bugs appear in large numbers. **DO NOT** apply insecticide when honey bees are present.
zeta-cypermethrin MUSTANG MAXX INSECTICIDE	32–46	2.8–4.0 fl.oz.	0.0175–0.025	3 (h,g) 7 (seed)	Mustang Maxx is a **RESTRICTED USE** pesticide.
STRIPED GROUND CRICKETS					
General Comments: *Apply an insecticide before overseeding clovers if excessive numbers of crickets (more than four or five crickets per square foot) are present.*					
carbaryl SEVIN XLR PLUS Other trade names [3]	3–4	1–1.5 qt.	1–1.5	14	Bee hazard; avoid treating crops when pollinating insects are active.
zeta-cypermethrin MUSTANG MAXX INSECTICIDE	32–46	2.8–4.0 fl.oz.	0.0175–0.025	3 (h,g) 7 (seed)	Mustang Maxx is a **RESTRICTED USE** pesticide.
THREE-CORNERED ALFALFA HOPPERS					
carbaryl SEVIN XLR PLUS	4	1 qt.	1	7	May cause injury to clovers that persist in the summer. Apply when insects become abundant.
zeta-cypermethrin MUSTANG MAXX INSECTICIDE	32–46	2.2–4.0 fl.oz.	0.014–0.025	3 (h,g) 7 (seed)	Mustang Maxx is a **RESTRICTED USE** pesticide.

[1] See the Alfalfa IPM for insect control on alfalfa stands.
[2] See Table 4 for a list of insecticides, formulations, restricted entry intervals, days to grazing or harvest, and maximum amount to apply.
[3] See Table 4 for other trade names.

Table 4. Insecticides Labeled for Use on Clover

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest or Grazing	Bee Hazard Restriction
carbaryl *MoA Group 1A					
SEVIN 4F, others	4 lb./gal.	liquid suspension	12	7	yes[1]
SEVIN XLR PLUS, others	4 lb./gal.	liquid suspension	12	7	yes[1]
CARBARYL 4L, others	4 lb./gal.	liquid suspension	12	7	yes[1]
chlorantraniliprole MoA Group 28					
DUPONT CORAGEN	1.67 lb./gal.	suspension concentrate	4	0	no
DUPONT PREVATHON	0.43 lb./gal	suspension concentrate	4	0	no
malathion MoA Group 1B					
MALATHION 5, 5E, 57EC, others	5 lb./gal.	emulsifiable concentrate	12	0	yes[2]
MALATHION 8, others	8 lb./gal.	emulsifiable concentrate	12	0	yes[2]
CHEMINOVA MALATHION 57%	5 lb./gal.	emulsifiable concentrate	12	0	yes[2]
FYFANON MALATHION INSECTICIDE	5 lb./gal.	emulsifiable concentrate	12	0	yes[2]
FYFANON ULV AG	9.9 lb./gal.	emulsifiable concentrate	12	0	yes[2]
FYFANON 8 LB EMULSION	8 lb./gal.	emulsifiable concentrate	12	0	yes[2]
s-methoprene MoA Group 7A					
EXTINGUISH PROFESSIONAL FIRE ANT BAIT	0.08 oz./lb.	bait	4	0	no
methoxyfenozide MoA Group 18					
INTREPID 2F	2 lb./gal.	liquid suspension	4	7 (h), 0 (g)	no
TROUBADOUR 2F	2 lb./gal.	flowable liquid	4	7 (h), 0 (g)	no
spinosad MoA Group 5					
ENTRUST SC	2 lb./gal.	soluble concentrate	4	3 (h), 0 (g)	yes[3]
zeta-cypermethrin MoA Group 3A					
MUSTANG MAXX INSECTICIDE **(RESTRICTD USE)**	0.8 lb./gal.	emulsifiable concentrate	12	3 (h,g) 7 (seed)	yes[2]

*MoA = Mode of Action classification from the Insecticide Resistance Action Committee. Insecticides with different MoAs should be used for insect resistance management.

Other products may be available. Always read the label to make sure the specific crop is listed and to determine what rate to use.

[1] BEE CAUTION: Do not apply this product to target crops or weeds in bloom. This product may show residual toxicity to honeybees, especially in humid climates and under slow drying conditions. This product is highly toxic to bees exposed to direct treatment or residues on crops or weeds in bloom. Notifying beekeepers within 1 mile of treatment area at least 48 hours before product is applied will allow them to take additional steps to protect their bees. Limiting applications to times when bees are least active, e.g., within 2 hours of sunrise or sunset, will minimize risk to bees.

[2] This product is highly toxic to bees exposed to direct treatment or residues on blooming crop weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

[3] This product is toxic to bees exposed to treatment during the 3 hours following treatment. Do not apply to blooming, pollen-shedding, or nectar-producing parts of plants if bees may forage during this time period.

Insect Pest Management section prepared by Kathy L. Flanders, Extension Entomologist, Professor, Department of Entomology and Plant Pathology, Auburn University.

WEED CONTROL

Weed control is frequently a necessary component of hay and pasture management. Most hay and pasture forages are generally very competitve with proper soil pH, fertility, moisture, and grazing management. However, weeds can still be a problem even in the best managed pasture. Weeds tend to reduce forage production and are generally lower in quality than most forage species, especially as they mature. Some weeds may also be poisonous to livestock and should be controlled when found. Other spiny or thorny weeds deter animals from grazing and result in decreased forage utilization. Finally, other very aggressive weeds known as invasive plants may completely overrun and replace desirable pasture species, resulting in tremendous losses in forage productivity.

The first thing to remember when considering pasture weed management is the following: there are no silver bullets that will solve pasture weed problems with a single shot. Pasture and hay weed management is generally needed on an annual basis. Weed generally have soil seedbanks that persist for several years. With long-lived seedbanks, eradication is very unlikely, except for very small infestations of new weeds. An old but true saying about many weeds is "One year of seed equals seven years of weeds."

Mowing for Weed Control

Mowing as a stand alone management tool has an important role in pasture weed management. Mowing is often used to clean up pastures from an aesthetic perspective. Mowing can also stimulate grasses to produce new shoots that are higher in quality than older rank growth. Depending on whether you have annual or perennial weeds, weeds will respond differently to mowing.

The timing of mowing is critical for maximum effect. When targeting herbaceous weeds, mowing is often most effective either at or just prior to early flowering. This timing is when annuals and biennials have fully shifted into reproductive mode and are most susceptible to defoliation. For herbaceous perennials, this timing is generally when root energy reserves are at their lowest and plants are most susceptible to defoliation. While most herbaceous weeds will recover from growing points below the mowing height, this timing appears to slow recovery more than earlier timings. Mowing after flowering, however, generally serves to spread weed seed and provides little control especially for annuals and biennials. For woody weeds, annual mowing makes things look better, but in the long run it only serves to create dense woody thickets and stobby stumps that damage tractor tires. It reduces foliage thus causing no translocation to the root so it doesn't kill the plant.

With these timing issues in mind, it may be necessary to pick your battles in mixed stands of weeds. Target specific weed species at the optimal timing and recognize that other species in the fields may not be controlled as well. Either way, mowing will open up the canopy and stimulate new forage growth. This is often greatly needed under dense stands of weeds where shading suppresses forage growth.

Integrating Mowing and Herbicides

Mowing integrated with herbicide treatment is a tricky business. It is often species specific. For example, after mowing blackberries or any woody species. You must have at least one year's worth of growth to have enough foliage to take in enough herbicide. Do not spray until the following growing season. For most annual weeds, do not mow for two weeks either before or after spraying. This ensures enough regrowth after mowing but before spraying for the weed to be able to absorb sufficient herbicides. After spraying, this no-mow window allows the herbicide time to translocate to the roots before mowing removes the top growth. For herbaceous perennials, spraying should be delayed after mowing until flowering or when there is 12 to 24 inches of regrowth. For woody plants, wait to spray after mowing until there are 3 to 4 feet of regrowth and do not mow for at least 2 months after treatment or until woody stems are dead.

For hayfields on a 28-day cutting schedule, herbicide treatment of herbaceous perennials and woody plants may be less effective. Several products are available that allow you to spray 7 days after cutting. For perenials, it is best to wait at least one month after the last cutting.This may or may not be possible since September and October are often very dry and early frost may prevent treatment. Another option would be to avoid cutting heavily infested areas to allow for a longer window for better herbicide performance.

Herbicide Use

When using herbicides, always read and follow label directions. Most pasture herbicides now have fewer restrictions on grazing or hay harvest than they previously did only a few years ago. However, there are still critical issues for many herbicides with regards to injury of certain grasses and legumes, plantback restrictions for small grains for winter grazing, and allowable uses of hay and manure where treatments have previously been applied

Additionally, herbicide use should be carefully considered in pastures near broadleaf crops or vegetables. Herbicide drift or volatilization may become serious issues in these situations. Herbicide efficacy is often reduced if applications are made during droughts or if very cold conditions persist in the winter or spring. Most herbicides that are applied to the foliage tend to work better when a surfactant is added to the spray tank. For pasture herbicides a non-ionic surfactant is often the best choice, but be sure to read the label for surfactant directions. Finally herbicide resistance has rarely been an issue in pastures, but the best approach is to rotate herbicides with different modes of action when possible.

Treat Annual and Perennial Weeds Differently

Annual weeds are better controlled when they are small (<4 to 6 inches) and actively growing. Many times they are hidden by the forage so care must be taken to be diligent and look for them. Perennials need at least one year of growth before spraying and are controlled best between flowering and fruting. They have a tremendous root system that can be up to three times bigger than the plant above the ground, so to kill them, you must have plenty of foliage to take up the herbicide.

Table 5. Pasture and Rangeland Recommendations

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				
BERMUDAGRASS PASTURES AND HAYFIELDS DURING ESTABLISHMENT								
PREEMERGENCE								
*Various (4 lb/gal)	diuron	12 hr/70 d	0.8–2.4 qt.	0.8–2.4 lb.	7	Apply after sprigs are planted but before emergence of bermudagrass or weeds.	Broadleaf weeds and grasses.	Plant sprigs 2 inches deep in a well-prepared seedbed. Do not treat areas where sprigs are planted less than 2 inches deep as crop injury may occur.
POSTEMERGENCE IN NEWLY ESTABLISHED PASTURE								
Clarity	dicamba	24 hr/30 d (slaughter) 7 d (lactating dairy and hay)	8–16 fl.oz.	0.25–0.5 lb.	4	Apply after bermudagrass is planted but before germinating weeds reach 1 inch in height.	Annual broadleaf weeds and some perennial weeds	Do not use on bentgrass, carpetgrass, buffalograss, and St. Augustine grass. Will kill or injure legumes.
*Various	2,4-D + dicamba	48 hr/30 d (slaughter) 7 d (lactating dairy and hay)	2–4 pt.	0.97–1.94 lb.	4 + 4	Apply after bermudagrass is planted but before germinating weeds reach 1 inche in height.	Certain annual and perennial broadleaf weeds	See label for precautions. Do not use on bentgrass, carpetgrass, buffalograss, and St. Augustinegrass. Do not spray on legumes. Use a NIS at 0.25% v/v.
ESTABLISHED PERENNIAL WARM-SEASON GRASS PASTURES AND HAYFIELDS								
PREEMERGENCE								
Prowl H2O	pendimethalin	24 hr/0 d	1.1–4.2 qt.	1–4 lb.	3	Apply preemergence before weeds emerge	crabgrass, panicums, annual foxtails, suppresses perennial foxtail	For use in ESTABLISHED, DORMANT warm-season perennial grasses including bermudagrass, bahiagrass, and others. Do not use on cool season grasses. An increase in rate will increase length of time weed control will last.
ESTABLISHED PERENNIAL GRASS PASTURES AND HAYFIELDS								
POSTEMEERGENCE								
2, 4-D Amine	2, 4-D	48 hr/7 d	2–4 pt.	1–2 lb.	4	Apply to weeds 2 to 6 inches tall.	Annual broadleaf weeds	Apply to weeds 2 to 6 inches tall. Apply low volatile esters from October through March. Apply only nonvolatile amine forms from April through late June. Add an NIS at 0.25% v/v or a COC at 0.5% v/v. See label for additional precautions and tank mixes.

Table 5. Pasture and Rangeland Recommendations

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				
ESTABLISHED PERENNIAL GRASS PASTURES AND HAYFIELDS (cont.)								
POSTEMERGENCE (cont.)								
2, 4-D LV	2, 4-D	48 hr/7 d	2 qt.	2 lb.	4	Apply in November or December when winter annuals emerge, and repeat in late February or March.	Winter annual weeds	Apply when temperature is 65 degrees F or above. Do not spray on legumes such as clovers, lespedeza, or alfalfa. See label for tank mix partners and additional precautions.
Aim EC	carfentrazone-ethyl	12 hr/0 d	0.5–1.5 oz.	0.008–0.024 lb.	14	Apply when weeds are smaller than 4 inches tall.	Bitter sneezeweed, spiny pigweed, jimsonweed, wooly croton, hophornbeam copperleaf, and jimsonweed controlled up to 4 inches tall; buttercup, dogfennel, horsenettle up to 4 inches tall will be suppressed.	Can be used on all pasture grasses. Add NIS at 0.25% v/v or a COC at 1% v/v and AMS at 2.5 pounds per acre. Do not make applications less than 7 days apart. Do not apply more than 3 applications per season.
Chaparral	aminopyralid + metsulfuron methyl	48 hr/0 d	1.5–3.3 oz.	0.067–0.15 lb.	2 + 4	Apply at 2.0 oz/a to provide control of most pasture weeds when applied early in the season.	Pensacola bahiagrass, ryegrass, spiny pigweed, beggarticks, sowthistle, and many other annual weeds in addition to woody plants such as Cherokeee and multiflora rose, wisteria, locust	Hay treated with Chaparral in the preceding 18 months CANNOT be distributed or made available for sale off the farm or ranch where harvested unless allowed by supplemental labeling. Hay from areas treated with Chaparral in the preceding 18-months CAN NOT be used for silage, haylage, baylage, and green chop unless allowed by supplemental labeling. Wait 14 days before cutting hay so that herbicide can work. Include a COC at 1%v/v, MSO at 0.5% v/v, NIS at 0.25% v/v, or AMS at 2 qt/A. Use a reduced rate of NIS on tall fescue as Chaparral may damage fescue.

Table 5. Pasture and Rangeland Recommendations

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				
ESTABLISHED PERENNIAL GRASS PASTURES AND HAYFIELDS (cont.)								
POSTEMERGENCE (cont.)								
Cimarron Max	metsulfuron + dicamba + 2,4-D	48 hr/37 d (hay)	Part A: 0.25–1 oz./A; Part B: 1, 2, and 4 pts./A	Part A: 0.01 lb.–0.04 lb.; Part B: 0.125, 0.25, and 0.5 lb.	2 + 4	Apply to actively growing weeds.	Annual and some perennial broadleaf weeds	Use an NIS at 0.5 to 1 pt./100 gal. of spray solution. See label for additional restrictions and instructions. See label for tank mix partners.
Clarity	dicamba	24 hr/(see comments)	8–32 fl.oz.	0.25–1 lb.	4	Apply to annual weeds when small and actively growing; Apply to perennial weeds when larger, later in the season.	Annual broadleaf weeds and suppresses perennial and brush species	Do not use more than 32 fl.oz. per acre per season. See label for tank-mix partners and restrictions. See label for drift cautions especially during the warm season months. Will kill clovers, alfalfa, and other legumes. For lactating dairy animals following treatment, up to 1 pt.
Crossbow	2, 4-D Ester + triclopyr	has dried/ (see comments)	1–4 qt.	0.75–3 lb.	4 + 4	Apply when weeds are actively growing. Best time to treat biennial and winter annual weeds is when the plant is in rosette stage.	Horseweed, wild lettuce, spiny amaranth, ground ivy, lespedeza, mouseear chickweed, wild carrot, horsenettle, thistle	This may not be applied to forage that is to be cut and sold for commercial purposes. Do not allow lactating dairy animals to graze treated areas until the next growing season. For all other animals, there are no grazing restrictions. Do not harvest hay for 14 days after application and do not slaughter until animals withdrawn at least 3 days. See label for additional restrictions and spray options for woody plant control.
Distinct	diflufenzopyr + dicamba	24 hr/0 d (grazing) 7 d (hay)	2–8 oz.	0.0875–0.35 lb.	19 + 4	Apply when weeds are small and actively growing.	Annual and biennial broadleaf weeds and suppression of annual grasses	Only use an NIS at a rate of 0.25% v/v that is 80% active. Will kill clovers, alfalfa, and other legumes. Do not apply to newly seeded grass. See label for tank-mix options, restrictions, and limitations.
Facet L	quinclorac	12 hr./7 d (hay) 0 d (graze)	22–32 fl.oz.	0.25–0.38 lb.	4 + 26	Apply when weeds are small and actively growing.	Knotroot foxtail, crabgrass, broadleaf signalgrass, and other grasses and broadleaves	Apply with a COC at 1% v/v or an MSO at 1 to 2 pints per acre. See label for all cool-season and warm-season grasses that you can spray and weeds that are controlled. See label for tank-mix partners, restrictions, and limitations.

Table 5. Pasture and Rangeland Recommendations

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				
ESTABLISHED PERENNIAL GRASS PASTURES AND HAYFIELDS (cont.)								
POSTEMERGENCE (cont.)								
ForeFront HL, GrazonNext HL	aminopyralid + 2, 4-D	48 hr/7 d (hay)	1.2–2.1 qt.	1.12–1.96 lb.	4 + 4	Apply to annual weeds when small and actively growing; Apply to perennial weeds during rosette stage; apply to brush from full leaf to flowering at least 1 year after mowing.	Annual and perennial broadleaf weeds	Residue in hay and manure can cause off-site problems. See label for all restrictions regarding the use and movement of ForeFront HL in hay. For optimum control, do not mow or cut hay for at least 14 days after application. Add a NIS at 0.25–0.5% v/v. May increase the palatablilty of poisonous plants. Do not graze until poisonous plants are dry and no longer palatable.
Grazon P + D	picloram + 2, 4-D	12 hr/0 d (except lactating see comments)	1–8 pt.	0.32–2.54 lb.	4 + 4	Apply to annual weeds when small and actively growing; apply to woody plants when plant is between flowering and fruiting stage, at least one year after mowing.	Annual and perennial broadleaf weeds and woody plants	This is a Restricted Use Pesticide. Do not allow lactating dairy animals to graze treated areas until the next growing season. For all other animals, there are no grazing restrictions. Do not harvest hay for 14 days after application and do not slaughter until animals withdrawn at least 3 days. Add an NIS at 0.25% v/v. Do NOT use treated grass or manure from animals being fed treated grass for composing and mulching of desirable susceptible broadleaf plants. See label for additional restrictions and precautions.
Impose	imazapic	12 hr/7 d (hay)	4–12 fl.oz.	0.063–0.188 lb.	2	Apply after bermudagrass has reached 100% green-up using the lower rates for annuals, the higher rates for weeds at or above the boot stage, and highest rates (8 to 12 oz./a) for perennial grasses or before a killing frost.	Broadleaf weeds and grasses, such as panicums, crabgrass, sandbur, and nutsedges	Only apply on bermudagrass, however, be aware that some varieties including Jiggs, is more senstive than others and may suppress growth to the point of losing a cutting of hay. Do not use on World Feeder bermudagrass. Use an NIS at 0.25% v/v.

Table 5. Pasture and Rangeland Recommendations

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				
ESTABLISHED PERENNIAL GRASS PASTURES AND HAYFIELDS (cont.)								
POSTEMERGENCE (cont.)								
Outrider	sulfosulfuron	12 hr/0 d	1.33 fl.oz.	0.062 lb.	2	For best control of johnsongrass, apply when it is actively growing and is at least 18 to 24 inches tall and up to the heading stage.	Johnsongrass, purple and yellow nutsedge, shepherd's-purse, catchweed bedstraw	May be used on bermudagrass and bahiagrass. An NIS containing at least 90% active ingredient is required at 0.25 to 0.5% v/v. For control of large established weeds or dense populations, a single application of up to 2 oz. may be used. For best weed control, do not mow or harvest the pasture to be treated for 2 weeks before or 2 weeks after application.
Pastora	nicosulfuron + metsulfuron	4 hr/0 d	1–1.5 oz.	0.045–0.067 lb.	2 + 2	Apply within 7 days of hay cutting when broadleaf weeds are less than 4 inches tall and grasses are less than 2 inches tall.	Broadleaf weeds and grasses	Labeled in bermudagrass only. An NIS at 0.25% v/v is preferred adjuvant. Do not make more than 2 applications per year or apply more than 2.5 oz per acre per year. Allow at least 16 days between applications. See label for tank-mix partners and other precautions.
Pasturegard HL	triclopyr + fluroxypyr	12 hr/14 d (hay) see comments	1–4 pt.	0.5–2 lb.	4 + 4	Apply to annual weeds when small and actively growing; apply to woody plants when plant is between flowering and fruiting stage, at least one year after mowing	Broadleaf weeds, woody plants such as blackberry, maypop, dogfennel, locust	Add a NIS at a rate of 0.25% v/v. See label for weeds controlled and specific herbicide use rates. Do NOT use on legumes, and reduce potential drift injury on legumes growing near treated area. Do not allow lactating dairy animals to graze treated areas until the next growing season. For all other animals, there are no grazing restrictions. Do not harvest hay for 14 days after application and do not slaughter until animals withdrawn at least 3 days.
Prowl H2O	pendimethalin	24 hr/0 d	1.1–4.2 qt.	1–4 lb.	3	Apply to warm-season grasses that have been cut for hay one time and cool-season grasses that have at least 6-tillers	Small-seeded broadleaf weeds and grasses	See label for tank-mix partners and further application instructions. Applications made after forage grass is 6 inches tall may result in poor weed control due to a lack of reduced spray coverage to the soil surface.

Table 5. Pasture and Rangeland Recommendations

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				
ESTABLISHED PERENNIAL GRASS PASTURES AND HAYFIELDS (cont.)								
POSTEMERGENCE (cont.)								
Remedy Ultra	triclopyr	When dried/See comments	2–4 pt.	1–2 lb.	4	Apply to annual weeds when small and actively growing; apply to woody plants when plant is between flowering and fruiting stage, at least one year after mowing.	Broadleaf weeds and woody plants	For broadcast applications, add an NIS, COC, MSO, or basil oil. See label for specifics on tank-mix partners and restrictions. Do not allow lactating dairy animals to graze treated areas until the next growing season. For all other animals, there are no grazing restrictions. Do not harvest hay for 14 days after application and do not slaughter until animals withdrawn at least 3 days.
*Various (5.5 lb./gal.)	glyphosate	4 hr	8–11 fl.oz.	0.34–0.47 lb.	9	Apply immediately after first bermudagrass hay cutting before new growth has started.	Broadleaf weeds and grasses	Broadcast application during growing season may cause growth stunt and yellowing, but usually grasses will grow out injury. Spot treatment should not exceed 10% of the total pasture. Significant injury may occur to forage grass with glyphosate applications.
Sharpen	saflufenacil	14 hr/0 d	1 oz. (bermuda) –2 oz. (all others)	0.022–0.045 lb.	14	Apply when weeds are small and actively growing.	Spiny amaranth, crotolaria, horsenettle, horseweed, ragweed, Canada thistle, and other annual broadleaf weeds	Apply an MSO at 1% v/v and an AMS at 8.5–17 lb./gal. for cool season and apply with only an MSO at 1% v/v with warm-season applications. Also is labeled for PRE control while establishing cool-season forage grasses.
Surmount	picloram + fluroxypyr	12 hr/see comments	1.5–6 pt.	0.40–1.61 lb.	4 + 4	Apply to annual weeds when small and actively growing; apply to woody plants when plant is between flowering and fruiting stage, at least one year after mowing	Broadleaf weeds and woody plants	This is a Restricted Use Pesticide. Do not allow lactating dairy animals to graze treated areas until the next growing season. For all other animals, there are no grazing restrictions. Do not harvest hay for 14 days after application and do not slaughter until animals withdrawn at least 3 days. Add an NIS at 0.25% v/v. Do NOT use treated grass or manure from animals being fed treated grass for composing and mulching of desirable susceptible broadleaf plants. See label for additional restrictions and precautions.

Table 5. Pasture and Rangeland Recommendations

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				
ESTABLISHED PERENNIAL GRASS PASTURES AND HAYFIELDS (cont.)								
POSTEMERGENCE (cont.)								
Velpar DF	hexazinone	48 hr/0 d (see comments)	0.9–1.5 lb.	0.67–1.12 lb.	5	Apply one time per year when weeds are actively growing	Smutgrass and other broadleaf weeds and grasses	Labeled in bermudagrass and bahiagrass only. Use in a minimum of 25 gpa for thorough coverage. Treated forage grasses mayy not be fed for hay until 38 days after application. Use low rate in sandy soils. An NIS will cause more injury to the forage grasses. See label for other precautions and restrictions.
Velpar L	hexazinone	48 hr/0 d (see comments)	2.75–4.5 pt.	0.67–1.12 lb.	5	Apply one time per year when weeds are actively growing	Smutgrass and other broadleaf weeds and grasses	Labeled in bermudagrass and bahiagrass only. Use in a minimum of 25 gpa for thorough coverage. Treated forage grasses mayy not be fed for hay until 38 days after application. Use low rate in sandy soils. An NIS will cause more injury to the forage grasses. See label for other precautions and restrictions.
*Various	2,4-D + dicamba	48 hr/7 d	2–4 pt.	0.97–1.94 lb.	4 + 4	Apply after bermudagrass is planted but before germinating weeds reach 1 inch in height.	Certain annual and perennial broadleaf weeds	See label for precautions. Do not use on bentgrass, carpetgrass, buffalograss, and St. Augustine grass. Do not spray on legumes. Use a NIS at 0.25% v/v.
DORMANT BERMUDAGRASS PASTURES								
Gramoxone SL	paraquat	24 hr/40 d	0.7–1.3 pt.	0.25 lb.	22	Apply when bermudagrass is dormant.	Annual broadleaf weeds and grasses	This is a Restricted Use Pesticide. Consult label for all restrictions on Gramoxone SL use and applications. An NIS at 0.25% v/v or a COC at 0.5% v/v is required for use.
Impose	imazapic	12 hr/7 d (hay)	6–12 fl.oz.	0.094–0.188 lb.	2	Apply when there is no green tissue at the root crown or on stolons.	Annual ryegrass, tall fescue, little barley, wildoats along with various winter annual broadleaf weeds	Add 10 to 20 gallons per acre of liquid nitrogen as the spray carrier. Do not add additional spray adjuvant when liquid fertilizer is used as the spray carrier. An NIS at 0.25% v/v may be used if nitrogen is not the spray carrier. See label for precautions.
Pastora	nicosulfuron + metsulfuron	4 hr/0 d	1–1.5 oz.	0.045–0.067 lb.	2 + 2	Apply targeting winter and early season weeds during dormancy	Broadleaf weeds and grasses	Labeled in bermudagrass only. An NIS at 0.25% v/v is preferred adjuvant. Do not make more than 2 applications per year or apply more than 2.5 oz per acre per year. Allow at least 16 days between applications. See label for tank-mix partners and other precautions.

Table 5. Pasture and Rangeland Recommendations

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				
DORMANT BERMUDAGRASS PASTURES (cont.)								
Prowl H2O	pendimethalin	24 hr/0 d	1.1–4.2 qt.	1–4 lb.	3	Apply in the late fall or winter when warm-season grasses have become dormant.	Grasses and small-seeded broadleaf weeds	See label for tank-mix partners and further application instructions. Applications made after forage grass is 6 inches tall may result in poor weed control due to a lack of reduced spray coverage to the soil surface.See label for tank-mix partners and further application instructions. Applications made after forage grass is 6 inches tall may result in poor weed control due to a lack of reduced spray coverage to the soil surface.
*Various (5.5 lb./gal.)	glyphosate	4 hr/NA	8–11 fl.oz.	0.34–0.47 lb.	9	Apply to small, actively growing winter annual broadleaf weeds and grasses.	Broadleaf weeds and grasses	Broadcast application during growing season may cause growth stunt and yellowing, but usually grasses will grow out injury. Spot treatment should not exceed 10% of the total pasture. Significant injury may occur to forage grass with glyphosate applications.
Sharpen	saflufenacil	14 hr/0 d	1–2 oz.	0.022–0.045 lb.	14	Apply with an MSO at 1%v/v and an AMS at 8.5 - 17/gallons.	Winter annual broadleaf weeds	Apply with an MSO at 1% v/v. Sequential applications may be applied anytime in the dormant season as long as the cumulative amount does not exceed 4.0 fl. oz./a.
FORAGE SORGHUMS								
POSTEMERGENCE								
2, 4-D Amine (4 lb/gal)	2, 4-D	48 hr/7 d	0.5–1 pt.	0.25–0.5 lb.	4	Apply over the top when weeds are small and when sorghum plants are 4 to 6 inches tall.	Annual broadleaf weeds	DO NOT spray over-the-top when sorghum plants are less than 4 inches tall or more than 10 inches tall. See precautions and restrictions on application information and drift.
Atrazine 90WDG	atrazine	12 hr/45 d	2.2 lb.	2 lb.	5	Apply after sorghum has emerged but before weeds are 1.5 inches tall.	Annual broadleaf weeds and grasses	This is a Restricted Use Pesticide. Do Not use on sandy loams or courser soil textures. Consult label for all restrictions on Atrazine use and applications.
Atrazine 4L	atrazine	12 hr45 d	2 qt.	2 lb.	5	Apply after sorghum has emerged but before weeds are 1.5 inches tall.	Annual broadleaf weeds and grasses	This is a Restricted Use Pesticide. Do Not use on sandy loams or courser soil textures. Consult label for all restrictions on Atrazine use and applications.

Table 5. Pasture and Rangeland Recommendations

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				
FESCUE CONVERSION*								
POSTEMERGENCE								
Gramoxone SL/ generics	paraquat	24 hr/60 d	1–2 pt. fb 1–2 pt. (2 lb. ai) 0.7–1.3 pt. fb 0.7–1.3 pt. (3 lb. ai)	0.25–0.5 lb.	22	Apply in split-applications 10–21 days apart when fescue is actively growing and no more than 4 inches high.	Controls endophyte-infected fescue when fescue is actively growing but no more than 4 inches tall.	This is a Restricted Use Pesticide. Consult label for all restrictions on paraquat use and applications. An NIS at 0.25% v/v or a COC at 0.5% v/v is required for use. Control will be better if fescue is not allowed to seed the previous year.
Poast plus, Poast	sethoxydim	12 hr/30 d	1.0–1.25 pt.	0.0.13–0.16 lb.	1	Apply to actively growing tall fescue after it has 4 to 6 inches of new growth and before the seedhead has emerged.	Tall fescue growth suppression	DO NOT mow tall fescue for 30 days before or 14 days after treatement. For greater suppression, apply up to 2.5 pt. per acre. Maximum annual application rate: 7.5 pt/A.
*Various (5.5 lb/gal)	glyphosate	4 hr	32 fl.oz. (5.5 lb. ai)	1.1 lb.	9	Apply with 1 qt fb 1 qt after regrowth occurs again.	Endophyte infected-fescue as well as other grasses	Check label to see if an NIS or COC is needed. Do not allow plants to reproduce seed. See label for tank-mix partners, restrictions, and maximum use rate /acre / year.
PASTURE RENOVATION								
Gramoxone SL	paraquat	24 hr/40 d	1–2 pt.	0.25–0.50 lb.	22	Apply when bermudagrass is dormant. For little barley control, apply before the mid-boot stage	Annual broadleaf weeds and grasses.	This is a Restricted Use Pesticide. Consult label for all restrictions on Gramoxone SL use and applications. An NIS at 0.25% v/v or a COC at 0.5% v/v is required for use.
WINTER GRAZING/GRAIN PRODUCTION (WHEAT, BARLEY, RYE, OATS, RYEGRASS)								
2, 4-D Amine	2, 4-D	48 hr/ 14 d	0.5–2 pt.	0.25–1 lb.	4	Apply when grain is in full tiller stage, but before boot stage.	Annual broadleaf weeds	See label for tank-mix partners and other timings depending on the grain you are growing. Limited to one POST application per cycle. Be aware of drift concerns and laws in your area affecting 2,4-D. An NIS should be added for POST applications at 0.25% v/v.

Table 5. Pasture and Rangeland Recommendations

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				
CLOVERS, LESPEDEZA, AND OTHER LEGUME FORAGES								
PREPLANT INCORPORATED								
Eptam 7E	EPTC	12 hr/14 d	2.25–4.5 pt.	1.97–4.0 lb.	8	Apply and incorporate just before planting.	Broadleaf weeds and grasses	Can be applied on alfalfa, birdsfoot trefoil, lespedeza. DO NOT use on white dutch clover. Established stands of alfalfa, ladino clover can be sprayed 2.5–3.5 pt prior to weed emergence. PHI= 45 d
ALFALFA, CLOVERS, LESPEDEZA, AND OTHER LEGUME FORAGES								
POSTEMERGENCE								
Gramoxone SL	paraquat	12 hr/60 d	1.0–2.0 pt.	0.25–0.5 lb.	22	Apply on established plantings during the dormant season during late fall or winter months after the last fall cutting and before first spring cutting.	Annual broadleaf weeds and grasses	See label for specifics on when Gramoxone SL may be applied to alfalfa and the rates that may be used. This is a Restricted Use Pesticide. See label for tank-mix partners. An NIS at 0.25% v/v or a COC at 0.5% v/v is required for use.
Kerb 50-W	pronamide	24 hr/ 50 d (harvest seed) 120 d (grazing and haying)	1.0–4.0 lb.	0.5–2 lb.	3	Apply during the fall or winter months; for best control apply under cool temperature conditions (55–60° F).	Controls susceptible winter annuals and perennial grasses and certain broadleaf weeds when applied preemerge.	This is a Restricted Use Pesticide. It may be applied both PRE and POST. See chart in label that gives you specific weeds, timings, and product amounts needed for optimum weed control.
Pursuit	imazethapyr	4 hr/NA	3–6 oz.	0.05–0.09 lb.	2	Apply when Alfalfa or Clover is in the second trifoliate stage or larger and when weeds are 1–3 inches tall.	Controls a broad spectrum of broadleaf and grass weeds.	Labeled for use on alfalfa, birdsfoot trefoil, and clover. May be applied to seedling alfalfa or clover. In established alfalfa or clover apply in the spring to dormant or semi-dormant alfalfa or clover growth or regrowth (3 inches). See label for adjuvants, tank-mix options, and use precautions.

Table 5. Pasture and Rangeland Recommendations

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				
ALFALFA, CLOVERS, LESPEDEZA, AND OTHER LEGUME FORAGES (cont.)								
POSTEMERGENCE (cont.)								
Select Max, generics	clethodim	24 hr/15 d	9–32 fl.oz. (0.97 lb. ai) 6–16 fl.oz. (2 lb. ai)	0.068–0.24 lb.	1	Apply to seedling or established alfalfa with an NIS at 0.25% v/v or a COC/MSO at 1% v/v.	Annual and perennial grasses	For repeat applications make on a minimum of a 14-d interval. See label for tank-mix recommendations including AMS and other legumes in which it may be applied.
Poast Plus, Poast	sethoxydim	12 hr /hay 20 d, forage 7d	1.5–3.75 pt. (1.0 lb. ai) 1.0–2.5 pt. (2.5 lb. ai)	0.19–0.47 lb.	1	Apply before mowing for best control	Annual Grasses	Always add a COC at 0.5% v/v. See label for general tank-mix partners, application timings, and rates.

Table 6. Estimated Effectiveness of Herbicides for Forage Crops on Selected Weeds [1]

WEEDS	NEW SEEDLINGS Legume Only		ESTABLISHED FORAGE STANDS				FORAGE SORGHUMS	
				Legume Only				
	Eptam (PPI)	Gramoxone SL	Pursuit	Kerb (POST)	Select	Poast	2,4-D amine (POST)	Atrazine (POST)
GRASSES								
Crabgrass	E	G	F	F	E	E	P	F
Fall panicum	E	G	F	P	E	E	P	F
Foxtails	E	G	E	P	E	E	P	G
Signalgrass	F	G	G	P	E	G-E	P	P
Texas panicum	F	G	P	P	G-E	G	P	P
SEDGES								
Nutsedge	G	P	F	P	P	P	P	P
BROADLEAVES								
Bitterweed	P	E	F	P	P	P	G	P
Curly dock	P	E	F	P	P	P	F	P
Dogfennel	P	F	P	P	P	P	F	P

[1]Ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama and the South. .
KEY TO CONTROL RATINGS AND ABBREVIATIONS E = Excellent control; G = Good control; F = Fair control; P = Poor control; — = Information not available.
S = Small; M = Medium; L = Large. POST = Postemergence.

Table 6. Estimated Effectiveness of Herbicides for Forage Crops on Selected Weeds [1]

WEEDS	NEW SEEDLINGS Legume Only		ESTABLISHED FORAGE STANDS				FORAGE SORGHUMS	
				Legume Only				
	Eptam (PPI)	Gramoxone SL	Pursuit	Kerb (POST)	Select	Poast	2,4-D amine (POST)	Atrazine (POST)
BROADLEAVES								
Field buttercup	P	E	F	P	P	P	G	P
Field dodder	P	G	P	G	P	P	P	P
Goldenrod	P	E	G	P	P	P	F	P
Horsenettle	P	E	P	P	P	P	P	P
Horseweed	F	P	P	P	P	P	G	E
Musk thistle	P	P	P	P	P	P	F-G	P
Plantains	P	E	F	P	P	P	E	E
Pokeberry	P	E	F	P	P	P	F	P
Redroot pigweed	G	E	E	P	P	P	G	E
Shepherdspurse	P	E	G	G	P	P	E	E
Smartweed	P	E	E	P	P	P	F	E
Wild garlic	P	P	P	P	P	P	F	F
Wild mustard	F	E	G	P	P	P	E	E
Surface-Loss Potential[2]	M	S	S	L	S	S	M	M
Leaching Potential[3]	M	S	S	S	S	S	M	M

[1]Ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama and the South. .
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S = Small; M = Medium; L = Large. POST = Postemergence.

Table 6. Estimated Effectiveness of Postemergence Herbicides for Forage Crops on Selected Grasses and Grasslike Weeds [1] (cont.)

TARGET GRASSES AND WEEDS	ESTABLISHED FORAGE STANDS									
	2, 4-D	Banvel	Chaparral	Cimmaron Max	Cimmarron Plus	Cross-bow	Grazon-Next	Grazon P+D	Impose/ Panoramic	Maverick/ Outrider
Barnyardgrass	P	P	P	P	P	P	P	P	—	P
Bahiagrass, Pensacola	P	P	G	G	G	P	P	P	G–E	P
Centipede	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**G-E**	**G**
Crabgrass	P	P	P	P	P	P	P	P	G	P
Dallisgrass	P	P	P	P	P	P	P	P	F	P
Foxtails, Annual	P	P	P	P	P	P	P	P	G	P
Foxtail, Knotroot	P	P	P	P	P	P	P	P	F	P
Goosegrass	P	P	P	P	P	P	P	P	F	P
Johnsongrass, Rhizome	P	P	P	P	P	P	P	P	G	E
Johnsongrass, Seedling	P	P	P	P	P	P	P	P	E	E
Nutsedge	P	P	P	P	P	P	P	P	G	G
Panicum, Fall	P	P	P	P	P	P	P	P	G	P
Panicum, Texas	P	P	P	P	P	P	P	P	F–G	P
Ryegrass, Italian	P	P	P	P	P	P	P	P	G	P
Sandbur	P	P	P	P	P	P	P	P	G	P
Signalgrass	P	P	P	P	P	P	P	P	G	P
Smutgrass	P	P	P	P	P	P	P	P	P	P
Vaseygrass	P	P	P	P	P	P	P	P	G	P

[1]Ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama and the South. .

KEY TO CONTROL RATINGS AND ABBREVIATIONS

E = Excellent control; G = Good control; F = Fair control; P = Poor control; — = Information not available.

POST = Postemergence.

Table 6. Estimated Effectiveness of Postemergence Herbicides for Forage Crops on Target Grass and Grasslike Weeds [1] (cont.)

TARGET GRASSES AND WEEDS	Pastora	Pasture-Gard	Prowl H_2O	Redeem R+P	Remedy Ultra	Roundup Powermax	Sharpen	Surmount	Velpar	Weedmaster
Barnyardgrass	E	P	G	P	P	G	P	P	P	P
Bahiagrass, Pensacola	G	P	P	P	P	F	P	P	P	P
Crabgrass	F	P	G	P	P	G	P	P	P	P
Centipede	P	P	P	P	P	F	P	P		P
Dallisgrass	F	P	P	P	P	F	P	P	P	P
Foxtails, Annual	G	P	G	P	P	G	P	P	P	P
Foxtail, Knotroot	F	P	P	P	P	G	P	P	P	P
Goosegrass	F	P	G	P	P	G	P	P	P	P
Johnsongrass, Rhizome	G	P	P	P	P	G	P	P	P	P
Johnsongrass, Seedling	E	P	G	P	P	E	P	P	P	P
Nutsedge	P	P	P	P	P	F	P	P	P	P
Panicum, Fall	G	P	G	P	P	G	P	P	P	P
Panicum, Texas	G	P	G	P	P	G	P	P	P	P
Ryegrass, Italian	G	P	F–G	P	P	P	P	P	P	P
Sandbur	F	P	G	P	P	G	P	P	P	P
Signalgrass	G	P	F	P	P	G	P	P	P	P
Smutgrass	P	P	P	P	P	G	P	P	P	P
Vaseygrass	G	P	P	P	P	F	P	P	P	P

[1]Ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama and the South. .
KEY TO CONTROL RATINGS AND ABBREVIATIONS
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Table 7. Estimated Effectiveness of Postemergence Herbicides for Forage Crops on Selected Broadleaf Weeds

WEEDS	ESTABLISHED FORAGE STANDS						
	2,4-D	Banvel	Chaparral	Cimarron Max	Crossbow	Grazon Next	Grazon P+D
Amaranth, Spiny	F	G	G–E	G	G–E	G	G
Bitterweed	F	E	—	E	—	E	E
Blackberry	P	P	G	F	G	P	F-G
Buttercup	G	E	G	E	F	E	E
Cherokee and Macartney Rose	P	P	F	—	—	F	F
Crotolaria, Showy	G	G	—	—	—	E	E
Croton, Wooly	G	E	E	E	E	E	E
Curly Dock	E	E	E	E	E	E	E
Dewberry	P	P	—	—	—	P	F
Dogfennel	F	G	P	E	F–G	F	E
Goldenrod	F	G	—	E	F–G	F	G
Ground cherry	—	—	E	—	F	E	F-G
Henbit	F	G	E	E	F–G	G	F
Horsenettle	F	F	E	G	F	G	G
Horseweed	G	E	E	E	F–G	G	E
Ironweed	F	G	G	P	F	F	P
Jimsonweed	F	F-G	G	F	G–E	E	F
Lambsquarters	—	G	E	E	E	E	E
Milkweed	—	—	P	P	P–F	P	P
Perilla Mint	F	F	—	—	—	G	G
Pigweed	F	E	G	G	E	G	E
Plantain	G	P	E	E	G–E	E	E
Poison Ivy	P-F	—	—	P	G–E	—	G–E
Pricklypear	P	P	P	—	—	P	F-G
Ragweed	E	E	E	G	E	G	E
Red Sorrel	P	G	G	G	F–G	—	E
Rose, Multiflora	P-F	G	G	F	F–G	P–F	F–G
Prickly Sida	F	G	G	—	—	F	P
Smartweed	F	G	E	E	G-E	E	E
Stinging Nettle	P	P	G	F	—	E	E
Thistle, Musk, Bull, Yellow, Milk	F	G	E	E	F–G	F-G	E
Tropical Soda Apple	P	F	G	P	—	E	E
Vervain, Blue	G	—	—	—	—	G–E	G–E
Wild Garlic	G	G	F–G	G	—	—	F–G
Wild Mustard	G	—	—	—	—	G	E

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Table 7. Estimated Effectiveness of Postemergence Herbicides for Forage Crops on Selected Broadleaf Weeds (cont.)

WEEDS	ESTABLISHED FORAGE STANDS						
	Impose/ Panoramic	Pasture -Gard	Redeem R+P	Remedy	Sharpen	Surmount	Weed -master
Amaranth, Spiny	P	F	G-E	F	E	E	G–E
Bitterweed	—	E	E	G	E	E	E
Blackberry	P	F-G	F-G	F-G	P	P-F	—
Buttercup	F	F	G	F	E	G	E
Cherokee and Macartney Rose	—	—	—	F	P	F	—
Crotolaria, Showy	—	E	—	—	P	—	G
Croton, Wooly	E	E	E	E	G	E	E
Curly Dock	P	G	G	E	G	E	E
Dewberry	P	F–G	P	F–G	P	F	—
Dogfennel	P	E	G	F	P	G	G
Goldenrod	P	G	F–G	G	E	F–G	G
Ground cherry	—	—	—	—	E	—	—
Henbit	P	E	E	G	P	E	P
Horsenettle	P	F	F	P	G	E	F
Horseweed	P	G	G	G	E	E	E
Ironweed	P	G	G	F	G	G	—
Jimsonweed	P	—	G	G	E	F–G	—
Lambsquarters	F	E	E	E	E	E	—
Milkweed	P	P	F	F	G	F–G	—
Perilla Mint	—	—	—	—	F-G	F	F–G
Pigweed	F	P	E	G	E	E	E
Plantain	P	G	G	E	G	G	G
Poison Ivy	—	P	G	G–E	G	G	—
Pricklypear	P–F	P	—	P	P	G	P
Ragweed	P	G	G	G	E	E	E
Red Sorrel	P	P	F–G	—	E	G	F
Rose, Multiflora	P	F-G	P	G	P	G	F
Prickly Sida	P	P	—	—	E	P	E
Smartweed	G	F	—	G	E	E	E
Stinging Nettle	—	E	E	E	F	E	P
Thistle, Musk, Bull, Yellow, Milk	P	G	G	G	G	E	G
Tropical Soda Apple	P	P	—	G	—	E	F
Vervain, Blue	P	—	—	—	G	E	—
Wild Garlic	P	P	—	—	P	P	G
Wild Mustard	G–E	G	—	—	E	E	—

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E = Excellent control; G = Good control; F = Fair control; P = Poor control; — = Information not available.

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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.

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 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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