

Enhancing *Crabgrass* Control in Hayfields

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Crabgrass (*Digitaria* spp.) is a warm-season annual grass that is commonly found in pastures and hayfields in Georgia. Relative to other warm-season annual grasses, crabgrass has a low to medium yield potential but is high in forage quality. As such, it is often a desirable component in pastures and is sometimes planted for forage in pastures. Improved varieties – such as ‘Red River,’ ‘Quick-N-Big,’ and ‘Mojo’ – have quick establishment and good nutritional value for livestock. Crabgrass is also a prolific seed producer, which enables new stands to establish in subsequent growing seasons for summer grazing.

Because of its high-volume seed production, crabgrass also has the potential to become a problematic and persistent weed in hayfields. Its competitive growth with perennial hayfield species contributes to stand thinning from spring to late summer, so growers are concerned about its economic impact. Crabgrass has a slower drying rate than most hay species, causing rotting and mold development after haling. Once it is dry, crabgrass often turns a dark brown or black color, which stands in stark contrast to the light green of other grass hay crops. This can substantially lower the value of the hay crop, so controlling the growth of crabgrass may be critical for long-term successful production.

Problematic Crabgrass Species in Hayfields

Several crabgrass species are problematic in hayfields in Georgia. These include southern crabgrass (*Digitaria ciliaris*), smooth crabgrass (*D. ischaemum*), and large crabgrass (*D. sanguinalis*). Southern and large crabgrass produce lateral stems that enable populations to spread vegetatively (Figure 1). These species root at the nodes, and after emergence, they may be particularly difficult to control with herbicides labeled for use in hayfields. Southern crabgrass has pubescent stems and sheaths, but the leaves have few to no hairs present. Smooth crabgrass is generally hairless, but may have several soft hairs at the base of the leaf (Figure 2). It has a clumped growth habit and does not produce lateral stems. Large crabgrass has soft hairs on the leaves, stems and sheaths of the plant.

Cultural Control of Crabgrass

Crabgrass begins to germinate in early spring when soil temperatures reach approximately 55 degrees Fahrenheit. The lifecycle of summer annual weeds is predictable; therefore, growers can modify management programs to reduce crabgrass establishment in spring. For example, nitrogen fertilization should be reduced during peak germination in areas with a history of crabgrass pressure. High nitrogen rates in summer will also encourage crabgrass seed production, dispersal and survival. Mowing is an important cultural practice that can

reduce the competitive growth of problematic weeds with hayfield species. Mowing before seedhead formation can suppress crabgrass growth and inhibit the production of viable seed. However, mowing will not kill crabgrass, and seedhead suppression may not significantly impact crabgrass weed pressure in subsequent years.

Practices that disturb the soil – such as aeration, sub-soiling, or tilling operations – should be conducted when tall fescue, bermudagrass or bahiagrass stands are actively growing. Voids left in fields with exposed soil may permit crabgrass invasion. Timing these operations during favorable periods for quick recovery promotes competition with weeds. In tall fescue hayfields, growers should reseed thinned areas to promote competition with crabgrass seedlings in spring.

Pre-emergence Control of Crabgrass – Established Hayfields

Growers may use pendimethalin (Prowl H₂O) in alfalfa, bahiagrass, bermudagrass and tall fescue hayfields for pre-emergence control of crabgrass. Applications should be timed when soil temperatures reach the low 50s in late winter or early spring. Prowl H₂O may be applied at 1.1 to 4.2 qt/acre in established hayfields in a single application, with a cumulative total of 4.2 qt/acre per year. Timing applications before a rainfall may enhance soil incorporation and herbicide activation. Split applications at reduced rates between cuttings can enhance residual control throughout the summer. There is no pre-harvest interval restriction for Prowl H₂O use. Sequential treatments applied at a six- to eight-week interval after the initial application may extend the length of residual crabgrass control through late summer. Prowl H₂O is not labeled for perennial peanut hayfields.

Post-emergence Control of Crabgrass – Grassy Hayfields

Herbicide applications should be timed in late spring for post-emergence control of crabgrass on established hayfields. Imazapic (Impose) may be used to control crabgrass in bermudagrass and perennial peanut hayfields. Bermudagrass may be treated with Impose at 4 to 8 oz/acre when crabgrass is actively growing in spring, but applications should not exceed 4 oz/acre on perennial peanut. Growers may also use nicosulfuron + metsulfuron (Pastora) at 1 to 1.25 oz/acre for early post-emergence control of crabgrass in bermudagrass in May or June. Pastora is most effective on crabgrass at a pre-tiller stage, while higher rates of Impose may control multi-tiller plants. Both herbicides should include a non-ionic surfactant at 0.25 percent v/v of spray solution.

Impose and Pastora should not be applied to tall fescue or other cool-season grasses because of excessive injury potential

in spring and summer. Quinclorac (Facet 1.5L) provides post-emergence control of immature crabgrass plants in tall fescue and bermudagrass. Applications should be timed when crabgrass is 1-tiller or smaller and should include a crop oil concentrate or methylated seed oil adjuvant for best results. Repeat applications will be needed for acceptable control of crabgrass in summer.

There are several limitations to using these herbicides for crabgrass control. For example, Impose and Facet may cause temporary injury to bermudagrass, such as yellowing of foliage and growth suppression in the summer. Impose may also reduce the initial yield of bermudagrass by as much as 50 percent in the spring or early summer. Additionally, there is a seven-day cutting restriction after an Impose and Facet application in hayfields. Pastora has less potential to injure bermudagrass than Impose, but it is less efficacious on mature crabgrass. Pastora may be applied at seven days after cutting bermudagrass to control seedling crabgrass, and there is no haying restriction after application. Both Impose and Pastora will severely injure alfalfa, bahiagrass and tall fescue. Growers have no selective control options for crabgrass in bahiagrass. Spot treatments of glyphosate are recommended in these species for the control of crabgrass.

In alfalfa, growers may use clethodim (Select Max, etc.) and sethoxydim (Poast, etc.) for post-emergence crabgrass control. These herbicides control grassy weeds after emergence and do not control broadleaf species. Alfalfa should not be harvested for 14 and 15 days after treatment of sethoxydim and clethodim, respectively. Clethodim will also control crabgrass in perennial peanut. However, there is a 40-day cutting restriction following clethodim applications in perennial peanut hay. Numerous clethodim and sethoxydim

products are available to end-users that have different adjuvant requirements for applications. Growers should always read the product label to determine whether a crop oil concentrate or non-ionic surfactant should be included with these treatments.

Herbicide Resistance

A major limitation to post-emergence control of crabgrass in Georgia is herbicide resistance. Resistance to acetyl CoA-carboxylase inhibitors (sethoxydim, etc.) in southern crabgrass has been confirmed at several locations in Georgia. Resistance develops from selection pressure by repeated use of the same herbicide or mode of action over years. Genetic differences among crabgrass biotypes present in populations contribute to susceptibility levels to herbicides. The main differences attributed to herbicide resistance include altered target-site binding or enhanced degradation. Other resistance mechanisms may include reduced absorption, herbicide sequestration, or overproduction of the target-site enzyme.

As susceptible biotypes are controlled by a particular herbicide over years, resistant biotypes may spread in these fields. This type of selection pressure will shift crabgrass populations from susceptible to resistant biotypes over a span of years. Resistance to acetolactate synthase inhibitors (Impose, Pastora, etc.) and dinitroanilines (Prowl H₂O) has risen exponentially in grassy weeds over the last decade. Growers should have an appreciation for the potential development of resistance to these herbicides, particularly in bermudagrass hayfields. This is due to the lack of herbicides available in hayfields that offer alternative modes of action. Pre-emergence control of crabgrass with Prowl H₂O will help delay resistance to post-emergence herbicides; but herbicide rotation, along with cultural control practices, will be critical for long-term sustainable management. ■



Figure 1. Southern crabgrass.



Figure 2. Smooth crabgrass.



Figure 3. The ligule of smooth crabgrass.



Figure 4. The ligule of southern crabgrass.

Crabgrass species all have a fleshy membranous ligule (an outgrowth from the sheath) at the base of the leaf (Figures 3 and 4). The southern crabgrass ligule has a fringe of hairs present, while the others do not. Seedheads are typically branched spikelets that extend outward from the plant. Crabgrass populations decline significantly in the fall and do not survive a killing frost. As crabgrass declines, areas with heavy infestations become predisposed to invasion by winter weeds, such as annual ryegrass.