

CHALLENGES IN WEED MANAGEMENT
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The challenges in cotton production are seldom more evident than in the area of weed control. Just a few years ago almost everyone thought Roundup Ready cotton was the solution to all of our weed woes. Then there were the fruit shed issues and weeds that survived treatment with glyphosate.

Among the species most widespread across the cottonbelt are the morningglories. Most researchers report satisfactory control with an aggressive RR systems approach with timely overtop, post-directed and layby application of glyphosate, especially when residual herbicides are included in the program. Less than satisfactory results are achieved when (1) morningglories are too large, (2) rates are too low, (3) plants are under drought stress, and/or (4) directed sprays do not achieve coverage of plants, especially where glyphosate is directed to the base of the cotton plants. A possible solution to this problem is to include pyriproxyfen (Staple or Staple Plus) as an overtop spray and/or post-direct with products like MSMA plus fluometuron (Cotoran), prometryn (Caparol, CottonPro), oxyfluorfen (Goal). The addition of carfentrazone-ethyl (Aim) to glyphosate post-directed sprays improves speed of activity on morningglories, but coverage in the row can still be an issue.

Palmer amaranth and other pigweeds are continuing problems virtually throughout the cottonbelt. Multiple emergence flushes, vigorous growth, and competitiveness of these weeds lead to heightened concern among producers. Why all the concern? We have observed a species shift in many areas of the cottonbelt. In the 1980's the main pigweed species in the Mid-South and Southeast was smooth pigweed. Now Palmer amaranth has invaded these regions. To complicate matters, ALS resistant species are also present in some areas. The ALS resistant plants are not controlled by pyriproxyfen (Staple). The most effective control is with glyphosate, but coverage of plants 'shadowed' by taller Palmer amaranth or cotton, coupled with lack of residual control, can lead to escapes.

Dayflower complex including tropical spiderwort (*Commelina benghalensis*) has developed into a serious problem in GA and FL. Tropical spiderwort has some tolerance to glyphosate, emerges throughout most of the growing season. Metolachlor (Dual) has good preemergence activity, and may fit with an early overtop glyphosate spray. Prometryn (Caparol, Cotton Pro) and flumoxazin (Valor, V53482) are among the most effective post-directed herbicides. Even with the best systems, control is usually <90%.

Florida pusley is also a challenge for growers in the Southeast, especially in Roundup Ready systems without the residual herbicides, pendimethalin (Prowl) or trifluralin (Treflan). Nutsedges pose a challenge throughout the cotton belt, but growers are making a headway where they apply two applications of glyphosate before the fifth leaf stage followed by a layby with glyphosate or MSMA. Dual preemergence or overtop with glyphosate should improve control of yellow nutsedge.

Eveningprimroses, dock, fleabanes, wild radish and many other broadleaf weeds are troublesome in no-tillage burndown situations. Control can be improved with the use of 2,4-D or Clarity in the burndown program.

Russian thistle (tumbleweed) is a challenge for High Plains cotton producers, but can be managed in a RR systems with application to smaller weeds and better spray coverage.

Glyphosate resistant weeds are an increasing concern across the cottonbelt. Horseweed (*Conyza canadensis*), sometimes called marestail, that is resistant to glyphosate was first discovered in Delaware, and subsequently in Tennessee, has quickly spread throughout West Tennessee. There are sites in Missouri, Mississippi, Alabama, Kentucky and North Carolina where producers had difficulty in obtaining control of horseweed with glyphosate. Other than tillage (not recommended on erodible soils), one or more of the following treatments are recommended to control glyphosate-resistant horseweed:

Preplant

Valor 51% water dispersible granule at 1 to 2 ounces per acre can be used after November 15 in combination with labeled burndown herbicides to control emerged weeds and provide residual weed control the following spring. A minimum of 30 days must pass, and 1 inch of rainfall/irrigation must occur, between Valor application and planting of cotton.

2,4-D low volatile ester. See label for rates and precautions. Exercise extreme care to avoid contact with desirable plants. Best results can be obtained when applied during warm weather and to actively growing weeds. Cotton can be planted 30 or

more days following application without concern for illegal residues. However, under certain conditions, there may be risk of injury to susceptible crops, including cotton. Unless prohibited, 2,4-D can be tank-mixed with other burndown herbicides.

Clarity at 8 ounces per acre preplant for control of emerged annual weeds prior to planting conventional or conservation tillage cotton. Best results are obtained when weeds are small and actively growing and during warm weather. Following application of Clarity, a minimum of 1 inch accumulation of rainfall or overhead irrigation, a waiting period of 21 days is required per 8 ounces, before planting cotton. May be tanked-mixed with Caparol, Gramoxone Extra, and Roundup Ultra for control of additional grasses and broadleaf weeds.

MSMA at 42 ounces per acre + diuron (Karmex, Direx) at 16 fluid ounces per acre liquid or 10 ounces dry formulation is one of the best options for suppressing emerged glyphosate-resistant horseweed during the interval within 21 days before planting of cotton. Weed control is most effective when temperatures are above 70°F.

Preplant or Preemergence

Gramoxone Max at 24 to 43 ounces per acre plus either fluometuron (Cotoran/Meturon) or diuron (Karmex, Direx) (see label for rates based on soil texture) is also effective in suppressing glyphosate-resistant horseweed during the interval within 21 days before planting of cotton. Terminal regrowth can occur. Avoid drift to sensitive crops.

Boa at 2.4 pints per acre plus Karmex or Direx (see label for rates based on soil type) is labeled for marestalk control. Terminal regrowth may occur and a second application may be needed.

Postemergence

MSMA at 42 ounces per acre postemergence overtop of cotton prior to pinhead squaring will suppress horseweed, but control is usually incomplete and cotton injury may occur, and crop maturity may be delayed, but yield is seldom reduced.

Post-Directed

Cotoran/Meturon + MSMA. Cotoran/Meturon at 32 ounces per acre plus MSMA at 42 ounces per acre may be applied post-directed to 3-inch cotton and will suppress horseweed with minimal risk provided contact with cotton is minimal.

Karmex/Direx + MSMA. Karmex/Direx at 12.8 fluid ounces of 4L or 8 ounces of 80 DF per acre plus MSMA at 42 ounces per acre may be applied to cotton at least 6 inches tall for glyphosate-resistant horseweed control.

Layby

Karmex/Direx + MSMA. Karmex/Direx at 1.6 to 2.4 pints per acre of 4L or 16 to 24 ounces of the 80 DF plus MSMA at 42 ounces per acre may be applied when cotton is at least 12 inches tall.

In addition to glyphosate-resistance, consideration should be given to the entire weed spectrum present in each field when developing a weed control program.

Another important challenge in weed management is that of timeliness. While glyphosate will kill larger weeds, it is important that early-season competition and loss of yield potential be avoided by making application of herbicide before weeds begin to compete. Smaller weeds are easier to control and generally lower rates of herbicide are required. Also, glyphosate has no residual activity, and without the addition of residual herbicides, weeds emerging after application may interfere with yield or reduce quality.