Managing Palmer Amaranth in Cotton

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Glyphosate-resistant Palmer amaranth is becoming widespread across the Coastal Plain. All infestations of Palmer are not resistant to glyphosate, but we are to the point where we need to assume it all is. We also have ALS-resistant Palmer. Again, it is not all resistant, but we need to assume that. And, some fields have resistance to both.

Growers fortunate not to have Palmer amaranth need to do what they can to prevent introducing it. This includes extra caution with used equipment, moving equipment from infested to non-infested areas, and custom harvesting. Gin trash should be avoided. And don't let a problem creep in from the ditch bank. For growers who have just a few scattered plants, it would be time well spent to pull them up. A few plants can turn into a disaster quickly. If seed heads are beginning to form, carry the plants out of the field. Viable seed form quickly after seed head formation.

Programs in RRF cotton. With glyphosate and ALS resistance, growers have no POST options for resistant Palmer amaranth in RRF cotton. The only way to deal with the weed is to never let it emerge, which means heavy reliance on residual herbicides. Residual herbicides will help prevent selecting for resistance where it is currently not present. If resistance is already present, residual control (especially preplant or PRE) is the only option we have.

In fields without resistance currently, at least two residuals would be recommended. The first could be Valor as part of the early burndown program in no-till followed by PRE herbicides, or Valor preplant followed by Dual Magnum or Warrant mixed with glyphosate POST. Other options would include PRE herbicides followed by Dual Magnum or Warrant, or PRE herbicides followed by a residual layby herbicide.

In fields with resistant Palmer, we need to have overlapping residuals from prior to planting through layby. In particular, we need to be aggressive with residuals at the front end of the season. This includes both preplant and PRE herbicides. Once Palmer amaranth is emerged, we may have no means to deal with it. In conventional tillage cotton, Prowl or Treflan properly incorporated is suggested, followed by PRE herbicides. For no-till or strip-till fields, the program should include Valor 2 to 3 weeks ahead of planting and another residual behind the planter. Add Dual Magnum or Warrant to the first in-crop application of glyphosate. Warrant can be applied twice POST, or one could use one application of Dual Magnum and one of Warrant. One application should be routine; the second application should be considered only in bad fields. Then follow with a residual layby. The goal is to have residuals working for us from prior to planting to hopefully the canopy closes so Palmer amaranth never has a chance to emerge. If a residual herbicide has not been applied preplant, there may not be time to put out Valor and meet the necessary waiting period. In that case, make sure you have a good PRE treatment, and hope it gets activated timely.

Reflex combinations, such as Reflex + Cotoran, Reflex + diuron, Reflex + Prowl, or Reflex + Staple have all been quite effective on Palmer if they get timely rainfall for activation. Valor and Reflex are both PPO inhibitors. We know of no resistance to PPO inhibitors in Palmer amaranth, but that is a situation we cannot afford. To prevent PPO resistance, we ideally would limit PPO's to one application per year. If Valor has been used preplant, suggested PRE options would

be Cotoran + Prowl, diuron + Prowl, Cotoran + Staple, or diuron + Staple. This combination or preplant and PRE herbicides should work well. If one insists on using Reflex PRE following Valor preplant, Reflex + diuron or Reflex + Cotoran would be suggested to take some selection pressure off the PPO's.

High organic matter soils in the Blacklands present a challenge because preplant and PRE options are limited. In no-till, Valor at 2 oz early preplant will give 3 to 4 weeks of control on soils up to about 30% organic matter. Unfortunately, most of the activity will be gone by planting (unlike mineral soils where 2 oz will give control for 6 weeks or more). Warrant seems to work well up to about 25% organic matter. Two applications of Warrant plus glyphosate followed by Valor at layby would be a good option. If Palmer is emerged at the first application, switch to glyphosate plus Staple (if not ALS resistant), follow with glyphosate plus Warrant and then the Valor at layby.

Programs in LL or WRF Cotton. Ignite, if properly timed, will control glyphosate-resistant Palmer amaranth. LibertyLink varieties have historically not performed well in North Carolina. However, that may be changing. To date, ST 4145 LLB2 has done well.

There is much interest in using Ignite on Phytogen WRF cotton in an effort to control glyphosate-resistant Palmer. Ignite can be legally applied to WRF cotton, but growers need to understand they accept any risk of crop injury. The companies involved (Bayer CropScience and Dow/Phytogen) have made that very clear. Growers need to be prepared to see some injury; some burn on the crop will be observed. To date, research has shown no impact on yield from two applications of Ignite so long as the rate was 29 fl oz or less, no AMS was included, and the last application was no later than about the 8-leaf stage. It would also be best to avoid application to thrippy cotton.

There are two key points growers need to remember before using Ignite on LL or WRF cotton. First, timing of application on Palmer amaranth is critical. For consistent control, Palmer amaranth should be no more than 3 to 4 inches tall. Considering how rapidly Palmer amaranth grows, it will be very easy to miss the optimum application timing. Spraying large weeds will mean less than adequate control, but in terms of resistance management, it is equivalent to cutting rates. Reduced rates encourage resistance.

Second, and this is very important, growers need to follow a strong resistance management program when using Ignite-based programs. Simply put, we will be depending more and more on Ignite in the future as crops with multiple stacked resistance traits (such as glyphosate + Ignite + 2,4-D or glyphosate + Ignite + dicamba) come into the market. Ignite may not be the silver bullet, but it is about as close as we are going to get for a while. Hence, it is imperative that we do not select for resistance to Ignite.

A suggested program using Ignite would be very similar to that previously discussed for RRF cotton. At least two residual herbicides in early season are in order. This could be a residual preplant (Valor) followed by a residual PRE, or one or more residual herbicides PRE followed by Dual Magnum mixed with Ignite POST. All of that should be followed with a residual layby. Residual herbicides preplant or PRE will give some flexibility in timing of the first Ignite application; they will buy some time. Moreover, they can help prevent resistance. Every Palmer amaranth killed by a PRE herbicide means one less subjected to selection pressure by Ignite.

See the *2011 Cotton Information* for more details.