

Glyphosate-resistant pigweed (*Palmer amaranth*)

is the most troublesome and costly weed in Arkansas soybean and cotton production. Prolific seed production and rapid growth make this weed extremely difficult to manage. Even with best management practices and near perfect herbicide programs, the soil seedbank can increase to near unmanageable levels.

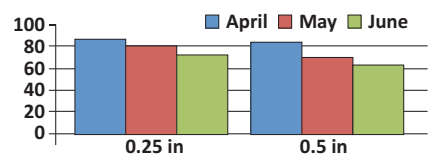
A single female pigweed plant is capable of producing over 1.5 million seed. This level of seed production emphasizes the importance of soil seedbank. Late-germinating pigweed and plants growing in heavy competition with crops produce less seed.

This large female pigweed found growing in a soybean field produced 1.8M seed.

Soil Residual Herbicides

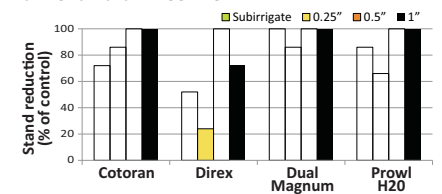
are essential for effective pigweed management in all systems. These herbicides require moisture for activation and without rainfall or irrigation after application, they are less effective and may allow weeds to become established. Early applications are more likely to receive rainfall in a timely manner than later season applications.

Percent chance of rainfall within 10 days of application in Keiser, AR (1991-2009)



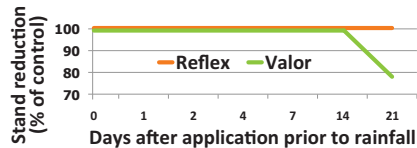
Some herbicides require more water for activation than others. Note Dual Magnum is effectively activated by subirrigation.

Palmer amaranth control



How long will a herbicide lay on the soil surface after application and still be effective when rainfall occurs. This varies greatly between herbicides, but two weeks is not uncommon for most herbicides that are commonly applied PRE.

Palmer amaranth control (14 days after rainfall):



Reflex and Valor will remain on the soil surface for many days without loss prior to rainfall.

On the cover: A heavy pigweed infestation (top) in 2009 is compared to a clean crop in the same field (bottom) in 2010. Proper use of residual herbicides and/or rotating technology are effective pigweed control measures.

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a guide to
Pigweed Management
for Soybean/Cotton



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Soybean Tips:

- **Start clean** – A good burndown program in the spring is a first step to good weed management. If pigweeds are present at planting time, Gramoxone Inteon or other paraquat herbicides are very effective to remove existing vegetation.
- **Be proactive – Do not use the first application of Glyphosate to determine if you have resistance!**
- **Use a program approach.** Single applications will not control Palmer pigweed season long.
- **Use a preemergence herbicide**, such as Dual, Valor, Authority MTZ or one of the Valor containing premixes, such as Envive.
- **Pendimethalin (Prowl) or trifluralin (Treflan) products** applied pre plant incorporated will also provide control or suppression of Palmer amaranth.
- **Flexstar at 1.25 pints per acre in-crop** will provide good control of Palmer amaranth that is below 2 inches tall. This may be as early as 10-14 days after soybean emergence. Flexstar can be tank-mixed with glyphosate for effective control of other weeds present.

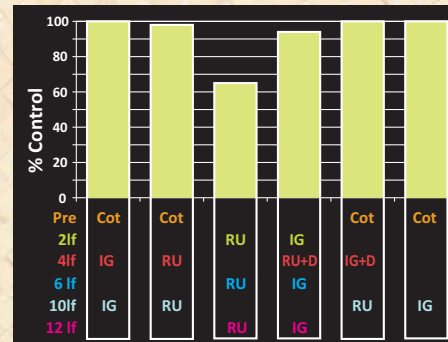


- **Prefix (Dual + Reflex)** is an excellent residual material for pigweed control; however, due to label restrictions on the total amount of fomesafen (Reflex/Flexstar) that can be used in a single growing season, this product should be reserved for POST application.
- **Rotation to Liberty Link® soybean and proper use of Ignite herbicide** is a good resistance management option. Ignite should be applied to 2-3 inch pigweed, following an effective residual (Pre-emerge) treatment, such as Prefix.
- **If no residual is used**, Ignite should be tank-mixed with a residual product like Dual or Prefix and applied to 2-3 inch pigweed approximately 7-14 days after soybean emergence. Use full labeled rates. Make a sequential application of Ignite when pigweeds re-emerge, prior to canopy closure.
- **A residual herbicide such as Dual Magnum or Prefix tank-mixed with glyphosate or Ignite will extend control** of the seedling pigweeds.

Cotton Tips:

- **Start clean** – A good burndown program in the spring is a first step to good weed management. If pigweed are present at planting time, Gramoxone Inteon or other paraquat herbicides are very effective to remove existing vegetation.
- **Use a preplant or preemergence herbicide** – Residual herbicides such as Direx and Valor applied in the burndown program should not be considered pigweed herbicides. Reflex applied preplant or Cotoran, Direx, or Caparol applied preemergence are

essential for weed control until the crop emerges and becomes established. Reflex preplant assures that the herbicide will be activated and working when the crop is planted. Preemergence herbicides require moisture after application and may not provide adequate control in dry years.



Palmer control in Cotton (Marianna 2009): Total POST programs are ineffective for pigweed management in both Roundup or Liberty Link technology.

- **Add additional residual herbicide such as Dual Magnum or Warrant** when cotton reaches 1-2 true leaf stage and at 6-8 true leaf stage.
- **Scout closely for escapes** and be prepared to post-direct Caparol + MSMA if seedling pigweed are noted.
- **Add another residual such as Valor, Direx or Caparol at layby** in combination with the broad-spectrum non-selective herbicide.

Weed control in soybean and cotton requires careful management and strong reliance on soil residual herbicides. However, there are other steps that must be taken to ensure sustainable weed control over years.

Long-Term Weed Management:

- **Be conscious of the amount of seed being added to the soil seedbank.** Removal of a few escapes by hand hoeing or spot spraying may be a very economical means of lowering the soil seedbank.
- **Rotate herbicides** to prevent even more resistance to different herbicide families. Rotating crops, technologies or traits facilitate herbicide rotation.
- **Rice is a good rotation** for pigweed management, but care must be taken to control it on the levees.
- **Cover mulch crops can be used** in combination with soil residual herbicides to reduce pigweed germination on flat-planted fields.
- **Control late-germinating pigweed** in fields after crop harvest. Pigweeds respond to day length and will initiate flowering and seed set 21 days after emergence when day length is shorter. A mature seed may be produced 10-14 days after flowering.
- **Manage pigweed on turn-rows, ditch banks and waste areas.** Seed and pollen are very mobile.
- **Don't move seed from field to field.** If escapes are present in some fields, clean equipment after leaving the infested field.



Pigweed emerging in a pattern following the combine trash from the previous year.