



Management of Palmer Amaranth in 2018

Ben Beale; UME Extension Educator St. Mary's County

UNIVERSITY OF
MARYLAND
EXTENSION

Palmer amaranth is a new aggressive pigweed that is now present throughout Southern Maryland and the Eastern Shore. All Palmer amaranth samples tested in Maryland were resistant to glyphosate and ALS herbicide chemistry. Palmer amaranth is native to the arid desert regions of the Southwest United States and Northern Mexico. It has gradually moved throughout the Southeastern Cotton belt as a major weed of soybean and cotton. The plant is well adapted to germinate and grow rapidly in the presence of moisture. In our region, Palmer amaranth germination begins in late April to early May and will continue throughout the summer. This weed is a prolific seed producer with female plants being capable of producing more than ½ million seeds of very small size. Due to its aggressive growth rate, high seed production and tolerance to both glyphosate and ALS chemistry, it has become a major weed of grain and vegetable crops in the region. Besides resistance to the two sites of action that are found on the Delmarva (glyphosate and ALS inhibitors), resistance against atrazine herbicides (NC), HPPD (NC), trifluralin (SC, TN) and PPO herbicides (NC, AR, MS) has been reported in many Southern states.

Key management steps:

- Learn to identify Palmer amaranth. The easiest way to manage Palmer amaranth is to recognize and eliminate Palmer amaranth plants before they produce seeds and proliferate. If you see pigweed plants that survive glyphosate application, be sure to take extra time to identify those plants. (For identification guide refer to UMD Agronomy News Oct. 2015 (<https://extension.umd.edu/sites/extension.umd.edu/files/docs/newsletters/AgronomyNews6-7.pdf>)
- Start clean. Options for effective post-emergent control in soybean are limited and the few options available must be used when Palmer amaranth plants are less than 4 inches tall. Palmer amaranth plants bigger than 4 inches are often only partly suppressed by herbicides and will grow back after a period of recovery. Fields should be clean of all Palmer amaranth before the crop emerges. Gramoxone® is an effective burn down treatment for smaller plants provided it is applied with adequate water and coverage is good.
- Use an effective residual herbicide as close to planting as possible. Residual herbicides will provide 3-4 weeks of control in most cases. This added control might not seem like much, but it gives the soybean more time to establish a closed canopy and provides added

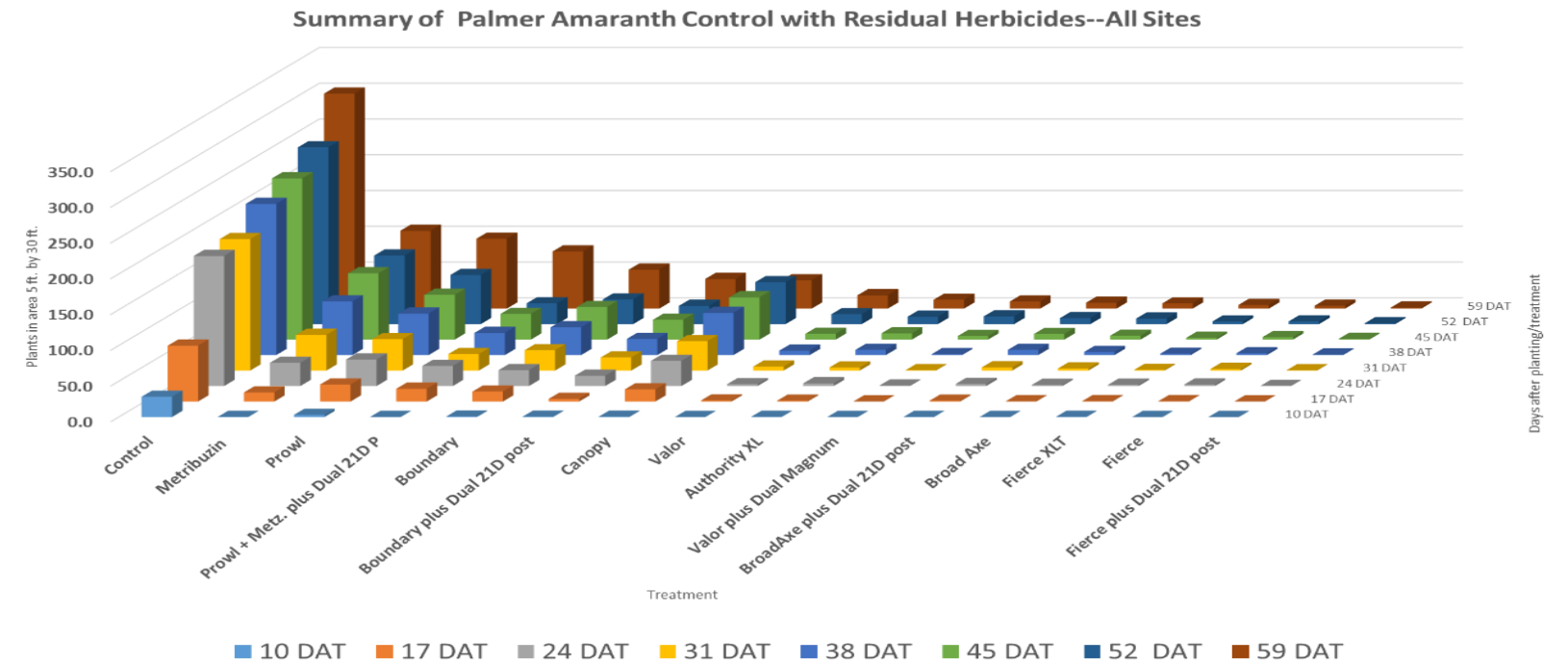
time to apply post-emergent controls. Residuals need to be applied as close to planting as possible to extend the period of control as far into the growing season as possible. Results from trials conducted in Maryland indicate significantly better control of Palmer amaranth with the use of any residual product when compared to a non-treated control. Products with flumioxazin (Valor) including premixes of Fierce or Fierce XLT or products with sulfentrazone (Authority) including premixes Broadaxe, Authority Elite, or Authority MTZ provided the most consistent control. The use of a residual herbicide also provides significant differences in weed height over the length of the season. This is especially advantageous in that it provides a longer period for the timely and thus effective application of post-emergent herbicides. Be sure to read labels carefully for factors such as rates and plant-back restrictions.

- Tank-mix residual products: Tank-mixing products with different modes of action often results in better control than either product applied alone. Dual®, Prowl®, Zidua®, and Metribuzin® are good examples of tank-mix partners for many residual products. There are many premix formulations currently available. Note the Dual cannot be tank mixed with Valor or crop injury may occur.
- Scout fields frequently for any emerged Palmer amaranth plants. It is critical to apply products on time before Palmer amaranth is too large.
- Apply an effective post-emergent herbicide before Palmer amaranth plants reach 3-4 inches in height. This means having a sprayer and operator ready to go when needed. For populations that are ALS resistant, the choices are limited to diphenylether herbicides such as Reflex®, Flexstar® (reflex + glyphosate), Cobra® or Ultra-Blazer®. These products require good coverage with at least 20 gallons of water and the proper adjuvant for effective weed control. For ALS susceptible populations, choices include those above plus Pursuit®, Scepter® or Synchrony® (STS). It is advised to assume that Palmer amaranth in Maryland is ALS-inhibitor resistant, as all tested populations have been found to show dual-resistance against glyphosate and ALS-inhibitor herbicides.
- Consider Liberty-Link® Soybeans: Liberty-link soybeans are tolerant of the herbicide glufosinate, sold under the name Liberty®. Glufosinate is a contact herbicide, so good coverage is important to achieve weed control (at least 20 gallons of spray volume). It provides effective

control of emerged Palmer amaranth plants if applied when the plants are still small up to 3-4 inches. Liberty® is weaker on grasses and perennial broadleaves than Round-up. Liberty-Link® beans are **not** tolerant to glyphosate, the active ingredient in Round-Up®. A residual program is still recommended when using the Liberty-Link® program.

- Consider Roundup Ready 2 Xtend Soybeans: RR2Xtend soybeans are tolerant to dicamba and glyphosate. Growers may only use dicamba formulations approved for use on RR2Xtend beans in their state. In Maryland the dicamba formulations Xtendimax, Fexapan and Engenia have received approval. These products contain an improved anti-volatilization chemistry, which reduces carry-over from treated fields. The approved dicamba formulations provide effective control of emerged Palmer amaranth plants up to 4 inches tall. They may be used as a pre-plant burn-down or for in-season post-emergent application. There are a number of label restrictions such as buffer requirements, tank-mix limitations, tank clean out requirements, specific nozzle requirements and wind speed restrictions. Any applicator applying Xtendimax, Fexapan and Engenia must attend training annually to legally use these products. Dicamba will severely injure most vegetable crops, non- Xtend soybeans, tobacco, fruits crops, landscape plantings and other sensitive plants. Growers are cautioned to only use these products according to label directions and to use due diligence to avoid off target movement of dicamba. Please read the label before using RR2Xtend soybeans with the approved dicamba herbicides. Non-approved dicamba products must not be used on RR2Xtend soybeans. A residual program is still recommended when using the Xtend program.
- Manage escapes. Hand pull any escaped plants before they go to seed. If escapes cannot be destroyed and Palmer amaranth is not present on other parts of the farm consider tillage to kill all plants and minimize the seed bank. Palmer amaranth seeds are relatively short-lived. If you are able to avoid new seed production for a few years the seed bank will be dramatically reduced.
- When harvesting crops, do not move equipment between infested and non-infested fields. Palmer amaranth seeds move readily in equipment, particularly the combine! Clean equipment between fields and harvest infested fields last.

Treatment Protocol for Pre-emergent Herbicide Trial	Post-emergent
Control	
4 oz Dimetric (metribuzin)	
1.25 pts Boundary (s-metolachlor + metribuzin)	
1.25 pts Boundary (s-metolachlor + metribuzin)	1.33 pts Dual 21D
4 oz Canopy (metribuzin + chlorimuron)	
1.5 pts Prowl (pendimethalin)	
1.5 pts Prowl + 4 oz Dimetric (metribuzin)	1.33 pts Dual 21D
3 oz Valor SX (flumioxazin)	
3 oz Valor SX + 1.33 pts Dual Magnum (flumioxazin + s-metachlor)	Off Label
3.75 oz Fierce (Valor + Zidua) (flumioxazin + pyroxasulfone)	
3.75 oz Fierce (Valor + Zidua) (flumioxazin + pyroxasulfone)	1.33 pts Dual 21D
4 oz Fierce XLT (Valor + Zidua + Classic) (flumioxazin + pyroxasulfone + chlorimuron)	
4 oz Authority XL (sulfentrazone + chlorimuron)	
25 oz BroadAxe XC (Sulfentrazone + s-metolachlor)	
25 oz BroadAxe XC (Sulfentrazone + s-metolachlor)	1.33 pts Dual 21D



Palmer amaranth identification



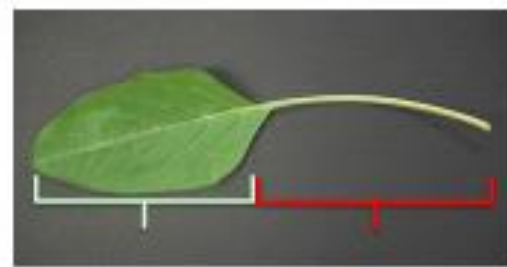
"watermark" on leaves (not always)



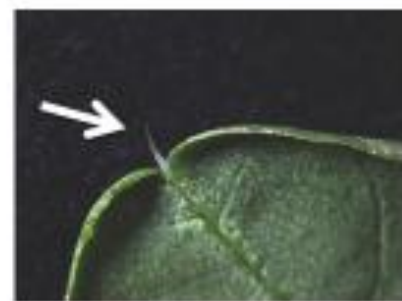
smooth stems and petioles



very long female (prickly) and male (soft) heads



very long petioles (leaf stalks)



hair on leaf tip



"poinsetta-like" rosette in young plants

Picture Credit: Burkhard Schulz

