Introduction, Stinkgrass, and the History of Palmer amaranth
Joe Ikley
Extension Weed Specialist
My Weed Science Journey
Control of glyphosate-resistant horseweed in no-till systems

Control of atrazine-resistant weeds in continuous conventional-till corn

Control of problematic weeds in small grains
  - Italian ryegrass
  - ALS-resistant chickweed
➢ Grass weed hosts of Goss’s wilt

➢ Control of Herbicide-resistant Palmer amaranth, waterhemp, horseweed, giant ragweed

➢ Two MOA resistance in all 4 species
  ▪ Three MOA resistance in pigweeds
Stinkgrass (\textit{Eragrostis cilianensis})

- Also called lovegrass (love-stinks)
- Summer annual
  - Emergence through July
  - 18 to 24” height at maturity
- Page 132 in Weed Control Guide
- Control Options (Canada)
  - Dual, Prowl, Outlook,
  - Accent
Stinkgrass Control in Wheat

- Tacoma: 97%
- Axial XL: 25%
- Beyond: 70%
- Everest: 45%
- Olympus: 2%
Stinkgrass Control in Corn/Soybean

- Liberty: 99%
- Roundup: 95%
- Primero: 85%
- Raptor: 70%
- Assure II: 95%
- SelectMax: 88%
- Atrazine: 5%
Palmer Amaranth
Known Palmer Habitat in 2019

Palmer amaranth distribution in the continental US

Map by Andrew Kniss, University of Wyoming
Palmer amaranth in Agriculture

- 1957 – Sauer: “Of all the dioecious amaranths, *A. palmeri* has been by far the most successful as a weedy invader of artificial habitats, whether they were prepared by primitive or modern technology.”
- 1989 – First appearance in Southern Weed Surveys
- 1995 – Most troublesome weed in cotton in the Carolinas
- 2009 – Most troublesome weed in cotton in 9/10 states
Herbicide Resistant Palmer – Timeline

➢ Group 3 – 1989 -
➢ Group 5 – 1993 -
➢ Group 2 – 1994 -
   ▪ 2008 – Israel
➢ Group 9 – 2005 -
   ▪ 2006 – 6 addition
   ▪ 2015 – Argentina
➢ Group 27 – 2011
➢ Group 14 – 2015
➢ Group 4 – 2018 -
Palmer amaranth in the Desert

- Summer ephemeral (short-lived plant)
  - One rainfall event enough to complete its life cycle
  - 4 weeks from germination to mature seed

- Characteristics of successful desert annuals
  - Rapid growth rate
  - High photosynthetic rate
  - Photosynthetic during high temperatures
    - Optimum at 108 F
  - Heliotropic
Palmer amaranth and Waterhemp Biology

Seed:
➢ Prolific seed production
➢ Long emergence period
➢ Small seed size

Biology:
➢ Rapid growth during ideal conditions
➢ Dioecious reproductive: Obligate out crosser
May 20, 2013

Average Max Temp – 77
Average Min Temp – 53
May 29, 2013

Average Max Temp – 74
Average Min Temp – 53
June 11, 2013

Average Max Temp – 77
Average Min Temp – 58
June 26, 2013

Average Max Temp – 83
Average Min Temp – 63
July 22, 2013

Average Max Temp – 83
Average Min Temp – 64
Palmer amaranth Control in Soybeans
(assuming it is glyphosate and ALS resistant but not PPO resistant)

➢ Start clean and use residuals at planting
  ▪ Sulfentrazone (Authority), flumioxazin (Valor), pyroxasulfone (Zidua)
  ▪ Metribuzin (at least 6 oz), metolachlor (Dual), acetochlor (Warrant),
    dimethenamid (Outlook), pendimethalin (Prowl)

➢ TIMELY post treatments + another layer of residual
  ▪ Flexstar/Cobra/Blazer + metolachlor, acetochlor, dimethenamid, or pyroxasulfone
    Or
  ▪ Liberty + metolachlor, acetochlor, dimethenamid, or pyroxasulfone in LL soybean
    Or
  ▪ Xtendimax/Engenia + approved group 15 in RR2Xtend soybean
Palmer amaranth Control in Soybeans
(assuming it is glyphosate and ALS resistant AND PPO resistant)

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Cultural and Mechanical Practices for Pigweeds

- Narrow rows for quicker canopy closure
- Tillage will control emerged plants
- Cereal rye cover crops have shown promise in the southern U.S.
  - Suppresses growth, does not replace herbicides
- Hand weeding: extremes in the south, but be willing to pull a few escapee’s at the end of season
- Combines are great spreaders: harvest heavily infested fields last
Is This a Desired Weed Management Strategy?