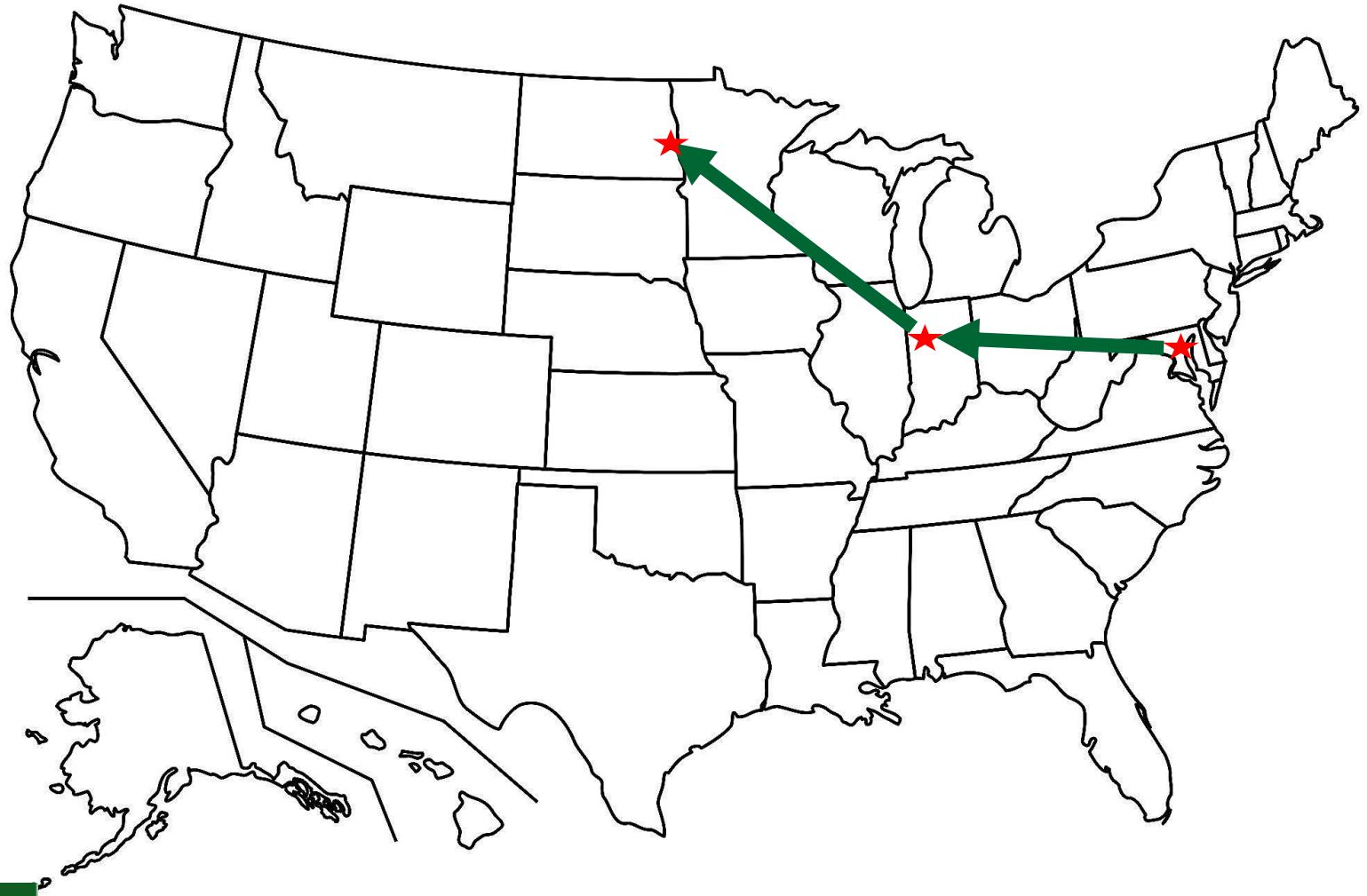
Introduction, Stinkgrass, and the History of Palmer amaranth

Joe Ikley

Extension Weed Specialist

NDSU NORTH DAKOTA STATE UNIVERSITY

My Weed Science Journey



University of Maryland

- 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


R. Ritter

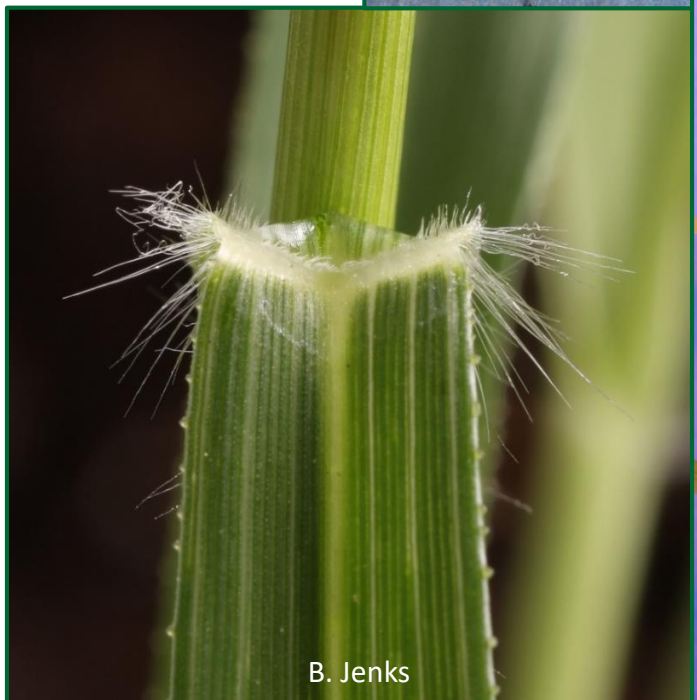
Purdue University

- 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 (*Eragrostis cilianensis*)

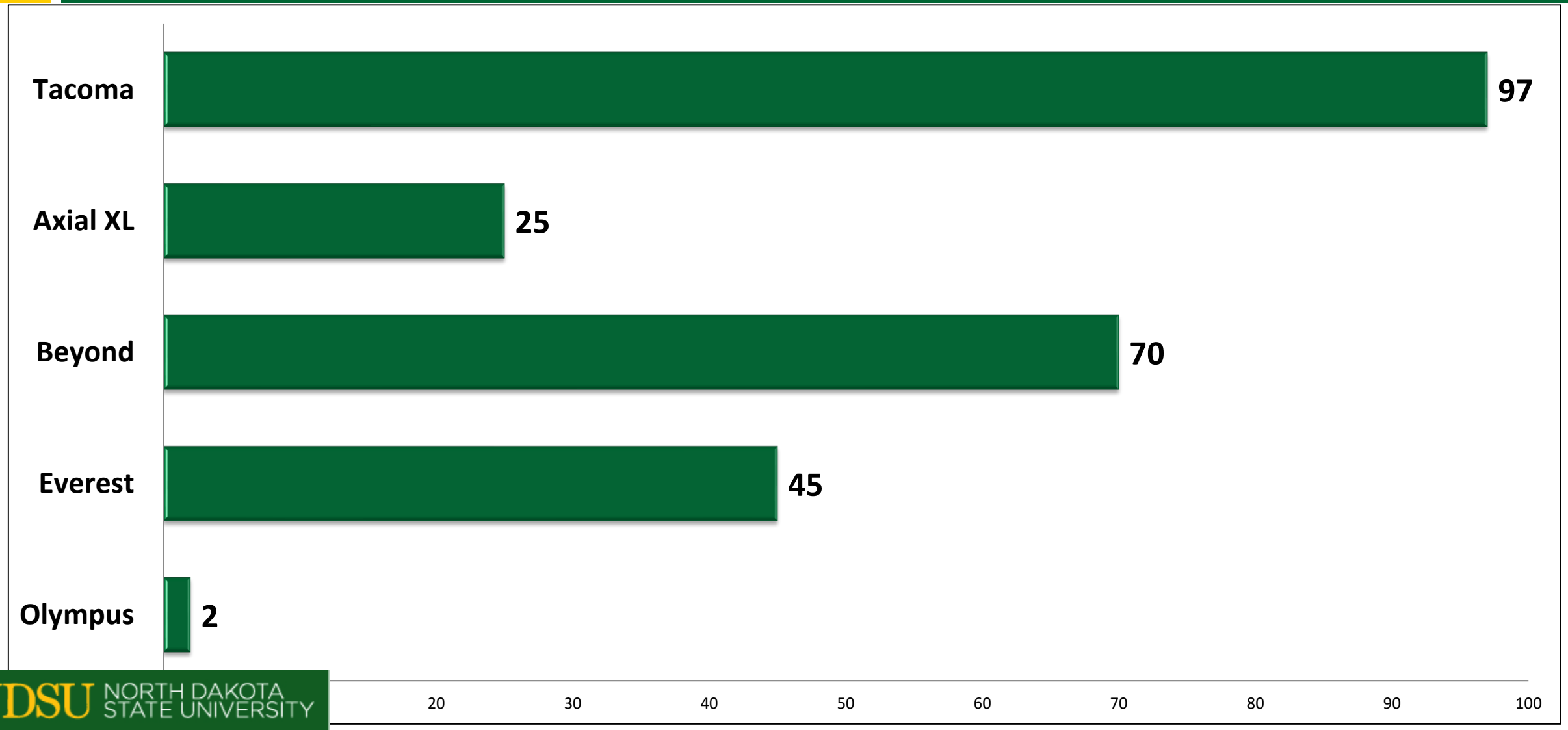
- Also called lovegrass (love-stinks)
- Summer annual
  - Emergence through July
  - 18 to 24” height at maturity
- Page 132 in Weed Control Guide
- Control Options (Canada)
  - Dual, Prowl, Outlook,
  - Accent


B. Jenks

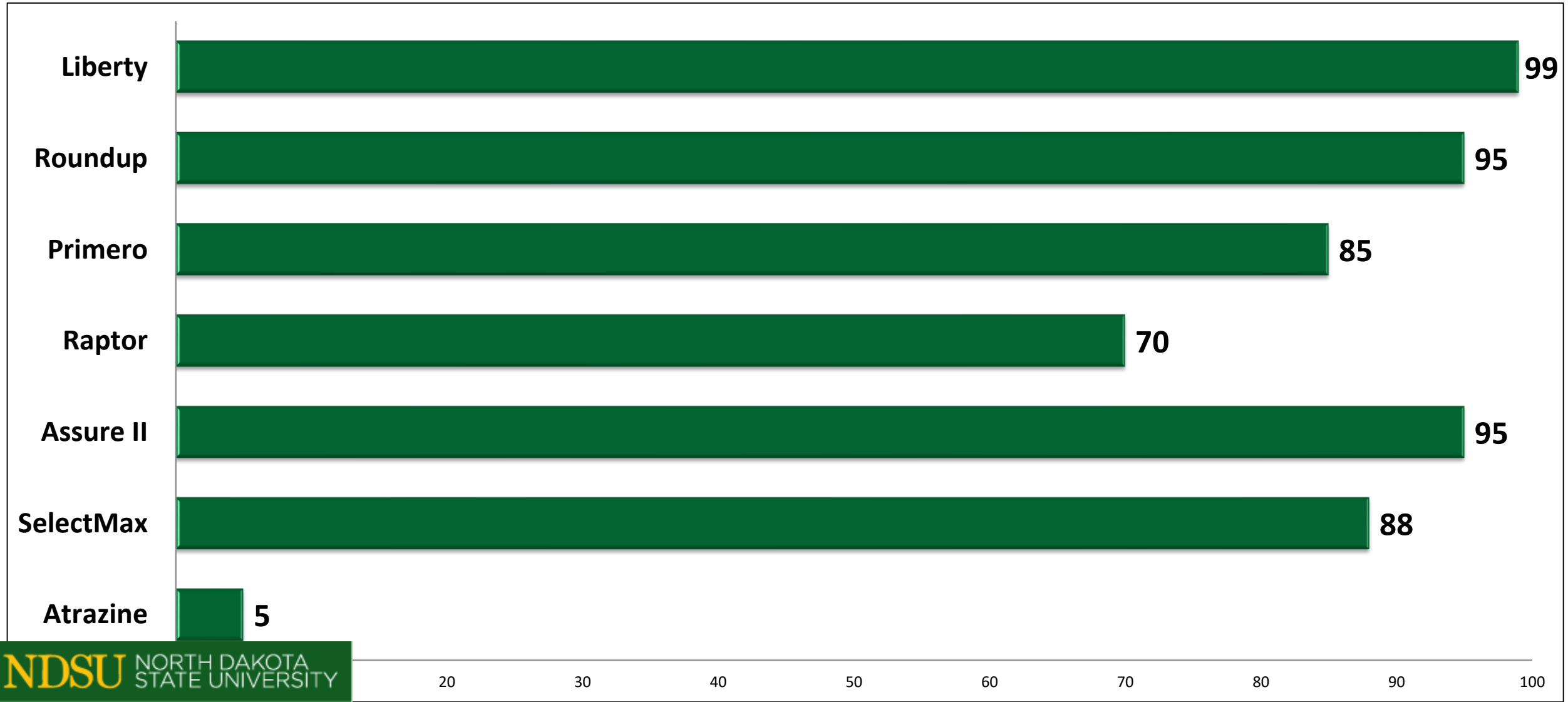

B. Jenks


J. Mettler

Stinkgrass Control in Wheat



Stinkgrass Control in Corn/Soybean



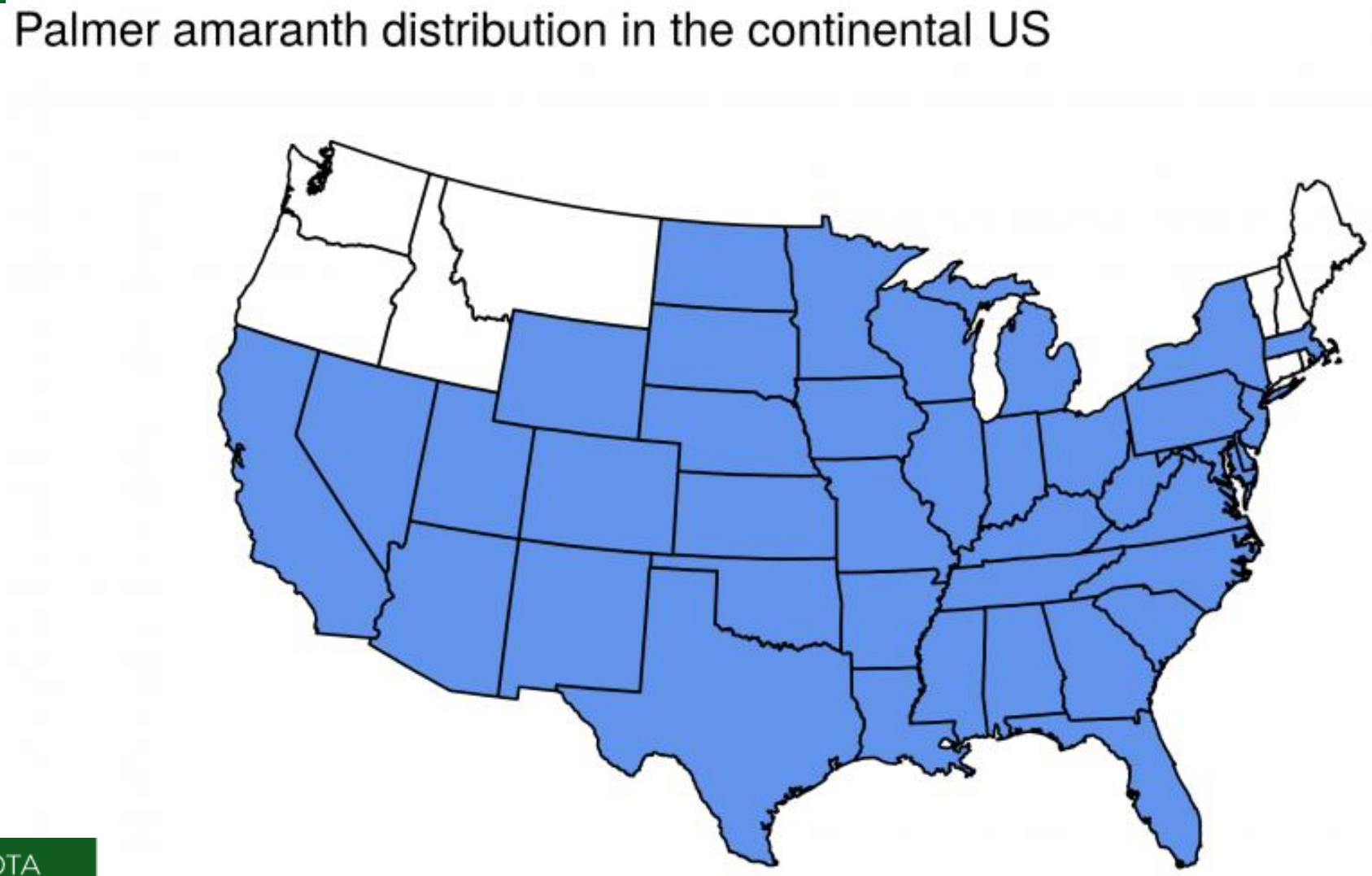
Palmer Amaranth

J. Ikley


T. Legleiter


T. Legleiter

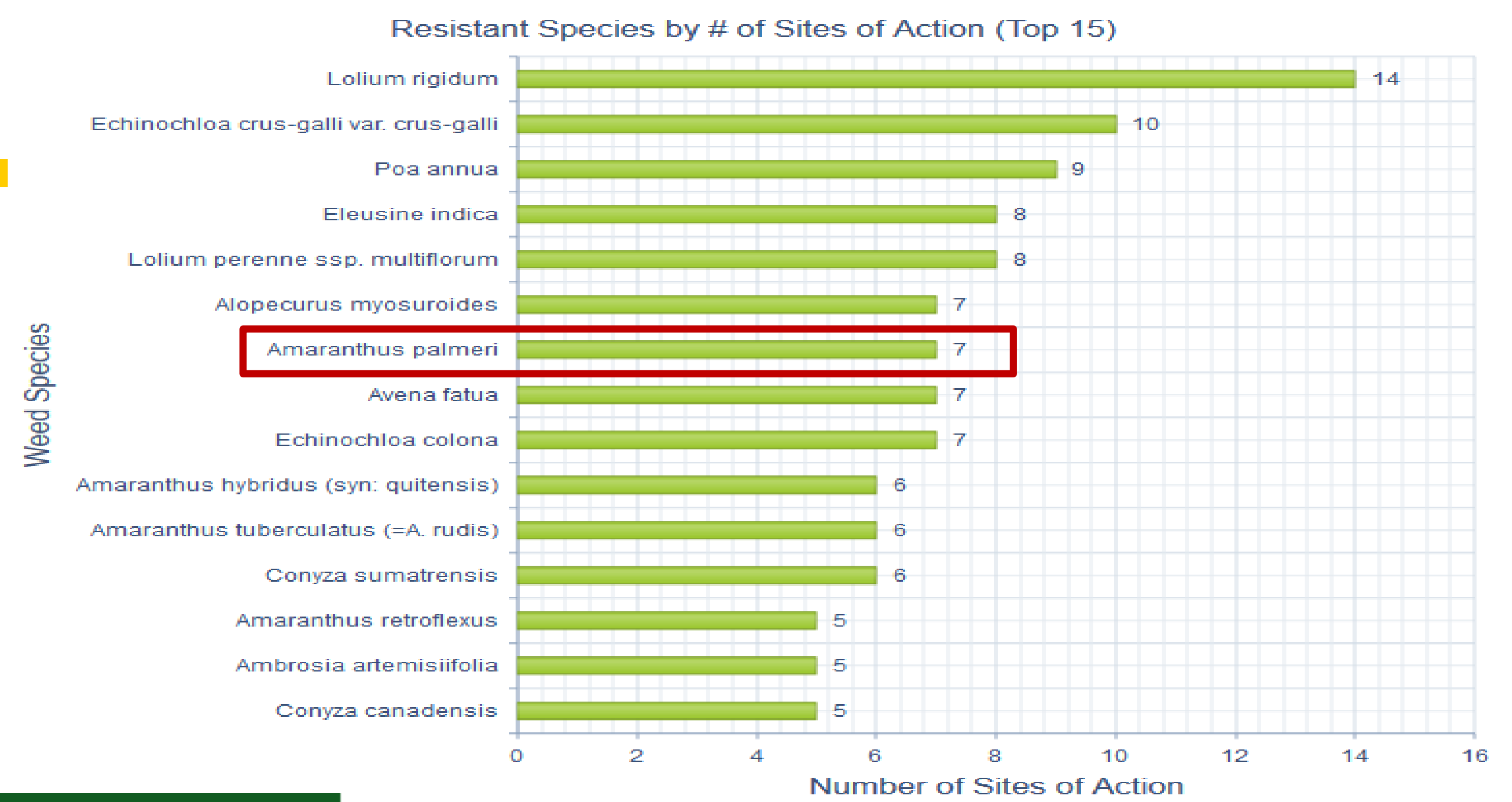
Known Palmer Habitat in 2019



Map by Andrew Kniss, University of Wyoming

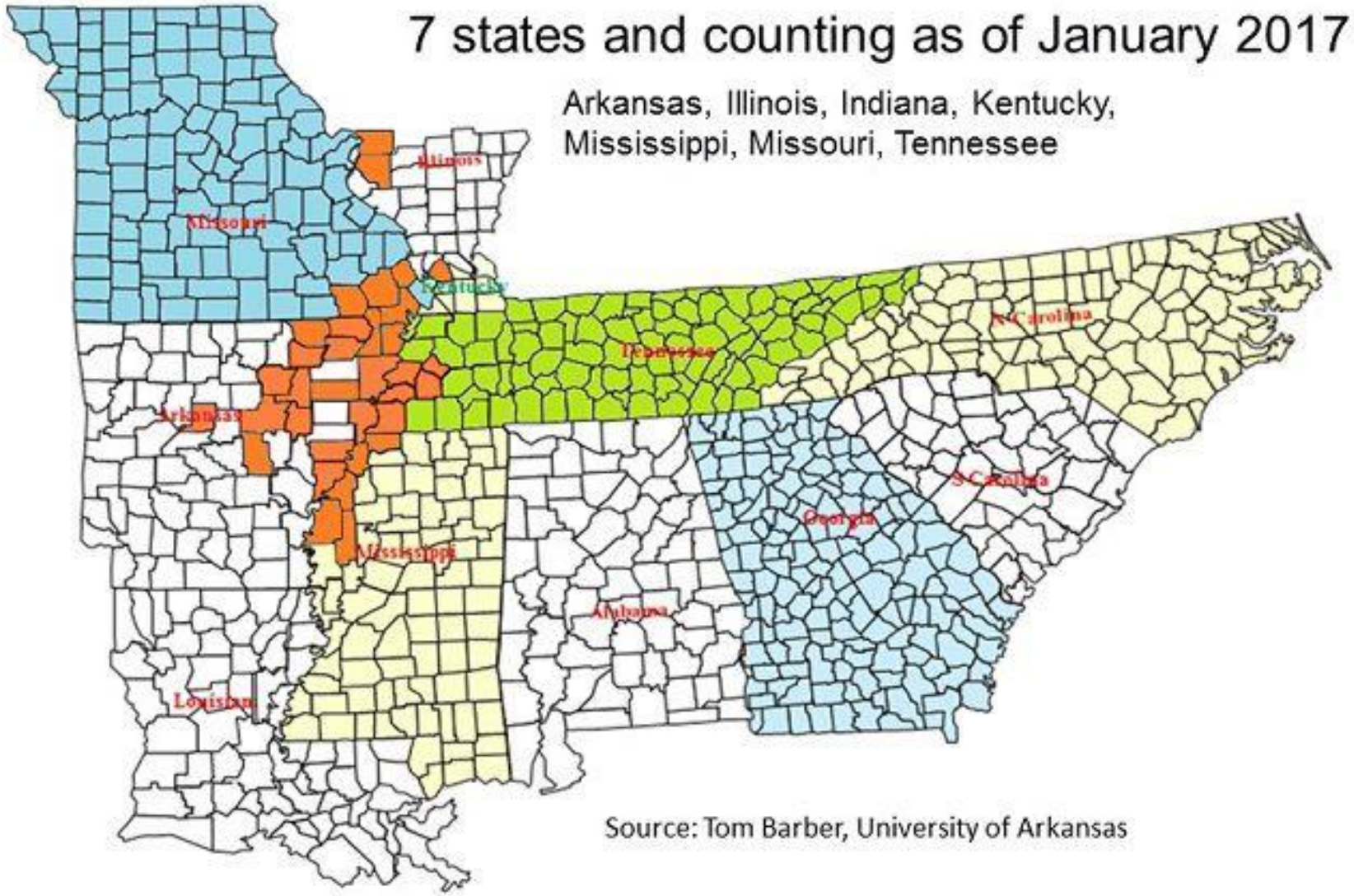
Palmer amaranth in Agriculture

- 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


J. Ikley


J. Ikley

NDSU NORTH DAKOTA STATE UNIVERSITY

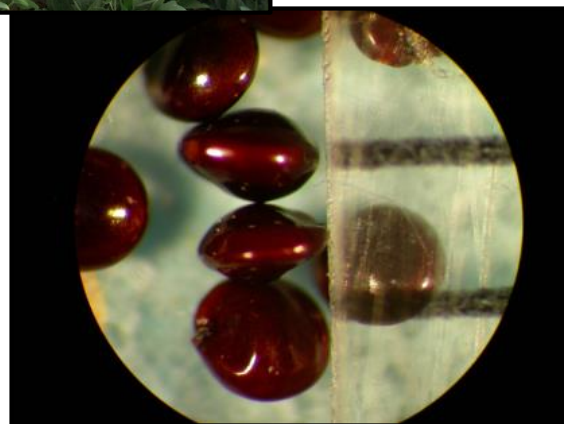
Palmer amaranth and Waterhemp Biology

Seed:

- Prolific seed production
- Long emergence period
- Small seed size

Biology:

- Rapid growth during ideal conditions
- Dioecious reproductive: Obligate out crosser



NDSU NORTH DAKOTA STATE UNIVERSITY

PURDUE

NDSU NORTH DAKOTA STATE UNIVERSITY

J. Ikley

Average Max Temp – 74
Average Min Temp – 53

June 11, 2013

J. Ikley

Average Max Temp – 77
Average Min Temp – 58

NDSU NORTH DAKOTA STATE UNIVERSITY

June 26, 2013

J. Ikley

Average Max Temp – 83
Average Min Temp – 63

July 22, 2013

J. Ikley

Average Max Temp – 83
Average Min Temp – 64

Palmer Amaranth

T. Legleiter

Waterhemp

T. Legleiter

NDSU NORTH DAKOTA STATE UNIVERSITY

NDSU NORTH DAKOTA STATE UNIVERSITY

J. Ikley

NDSU NORTH DAKOTA STATE UNIVERSITY

J. Ikley

NDSU NORTH DAKOTA STATE UNIVERSITY

J. Ikley

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)

- 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

NDSU NORTH DAKOTA STATE UNIVERSITY

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

T. Legleiter

PURDUE EXTENSION WEED SCIENCE

Photo credit: Tom Barber, University of Arkansas

NDSU NORTH DAKOTA STATE UNIVERSITY

T. Legleiter

NDSU NORTH DAKOTA STATE UNIVERSITY

J. Ikley

J. Ikley

J. Ikley

NDSU NORTH DAKOTA STATE UNIVERSITY

Is This a Desired Weed Management Strategy?