

# **Climatic Variability as a Driving Force for Integrated Weed Management**

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The standard question on jointed  
goatgrass control.

“Have you found a solution?”

**Higher  
Seeding  
Rate**

**Burning  
Straw**

**Seed Size**

**Border  
Sanitation**

**Numerous  
Practices  
Some Major,  
Some Minor.**

**Imazamox**

**Graze-out**

**Plowing**

**Initial Spring  
Tillage**

**No Single  
Solution**

**Taller  
Cultivars**

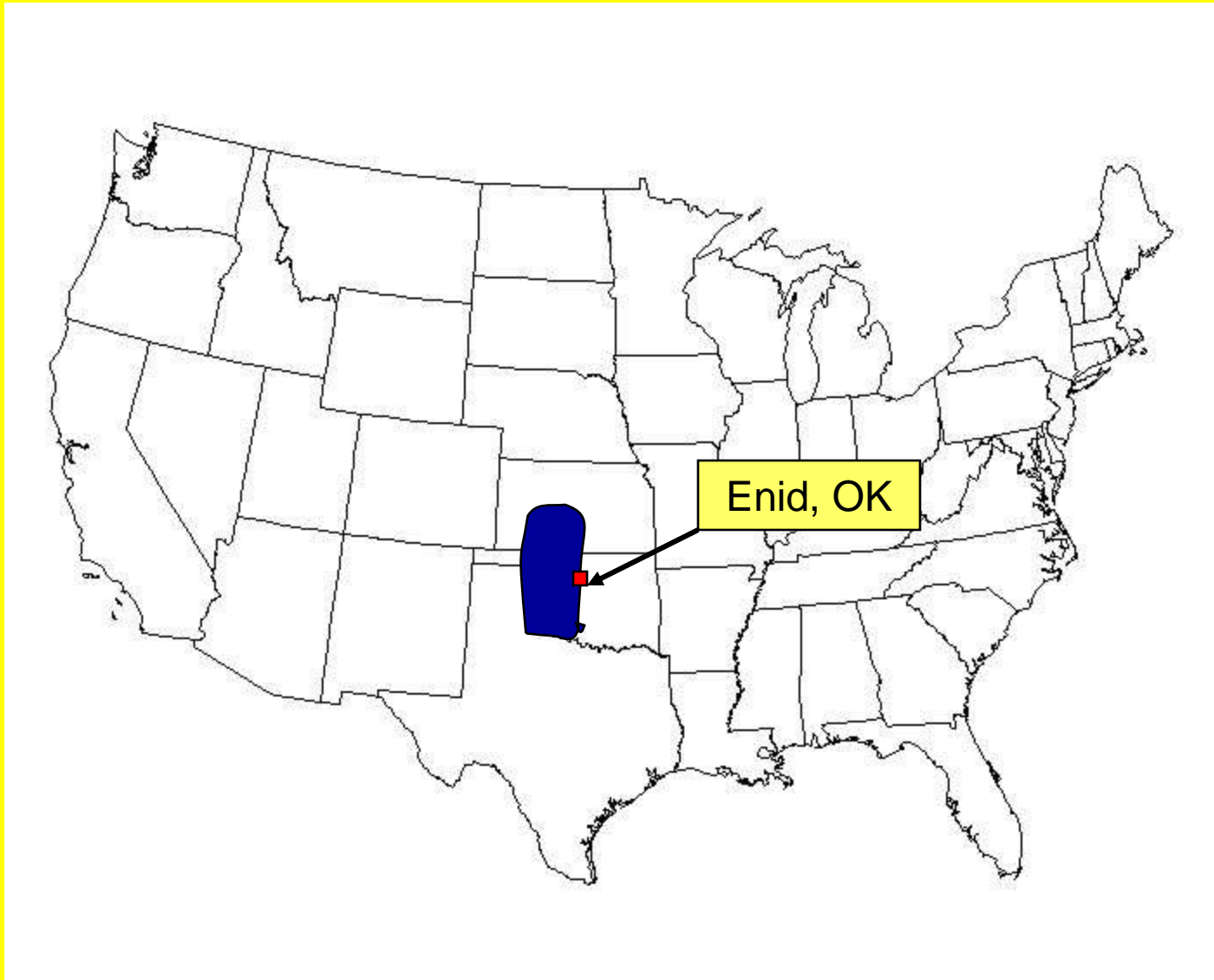
**Crop Rotation**

**Fertilizer  
Placement**

A multi-practice (integrated) approach, with different practices acting at varied times during the wheat production cycle, is the best approach to jointed goatgrass management.

An examination of three major wheat producing regions in the western U.S., noting how climate has influenced the production systems in these regions, will illustrate why a multi-practice approach is required.

# Southern Great Plains Wheat Cropping Region



- Spring-Summer precipitation pattern (80% received March-October)
- High average precipitation (34" annual at Enid, OK identical to Ames, IA) allows continuous cropping of winter wheat.
- But!!! June-Aug. temperatures limit crops other than winter wheat. (JJA ave. high >90 F, 10 F higher than Ames)
- Precipitation can be highly variable, especially when comparing the same month between different years.

# Implications of SGP Climate for JGG Control

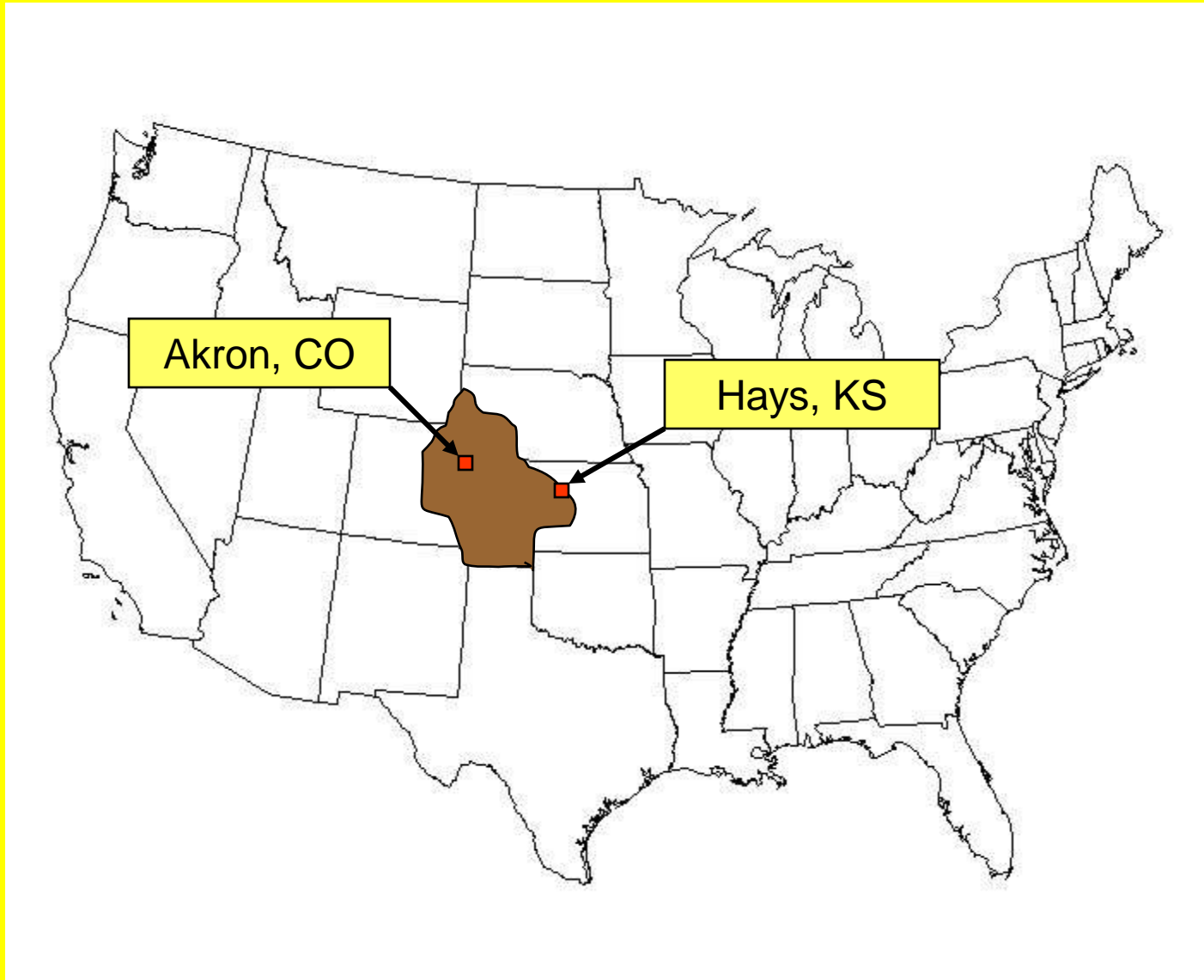
- Enhancing seed-soil contact to stimulate seed germination and allow for timely seedling destruction is an important practice. The effectiveness of this practice can be limited by variable Aug. rainfall. (Lahoma, OK Aug. 98 .86", Aug. 99 4.31", Aug. 00 0.0", Aug. 01 6.06")
- Opportunities for crop rotation limited.



# Implications of SGP Climate for JGG Control

- Deep burial of spikelets (moldboard plowing) a major practice.
- Practices to enhance competitiveness of the crop work well if combined and used over several years.
- Grazing can help or hinder control

# Central Great Plains Wheat Cropping Region



- Spring-Summer precipitation pattern (85% received March-October).
- Moderate average annual precipitation, higher in east (Hays, KS 23”), lower in west (Akron, CO 16”).
- Variability in precipitation still a major factor. (Akron, CO 1999 21.6”, 2002 9.5”) Effects of variability are compounded as annual precipitation decreases.

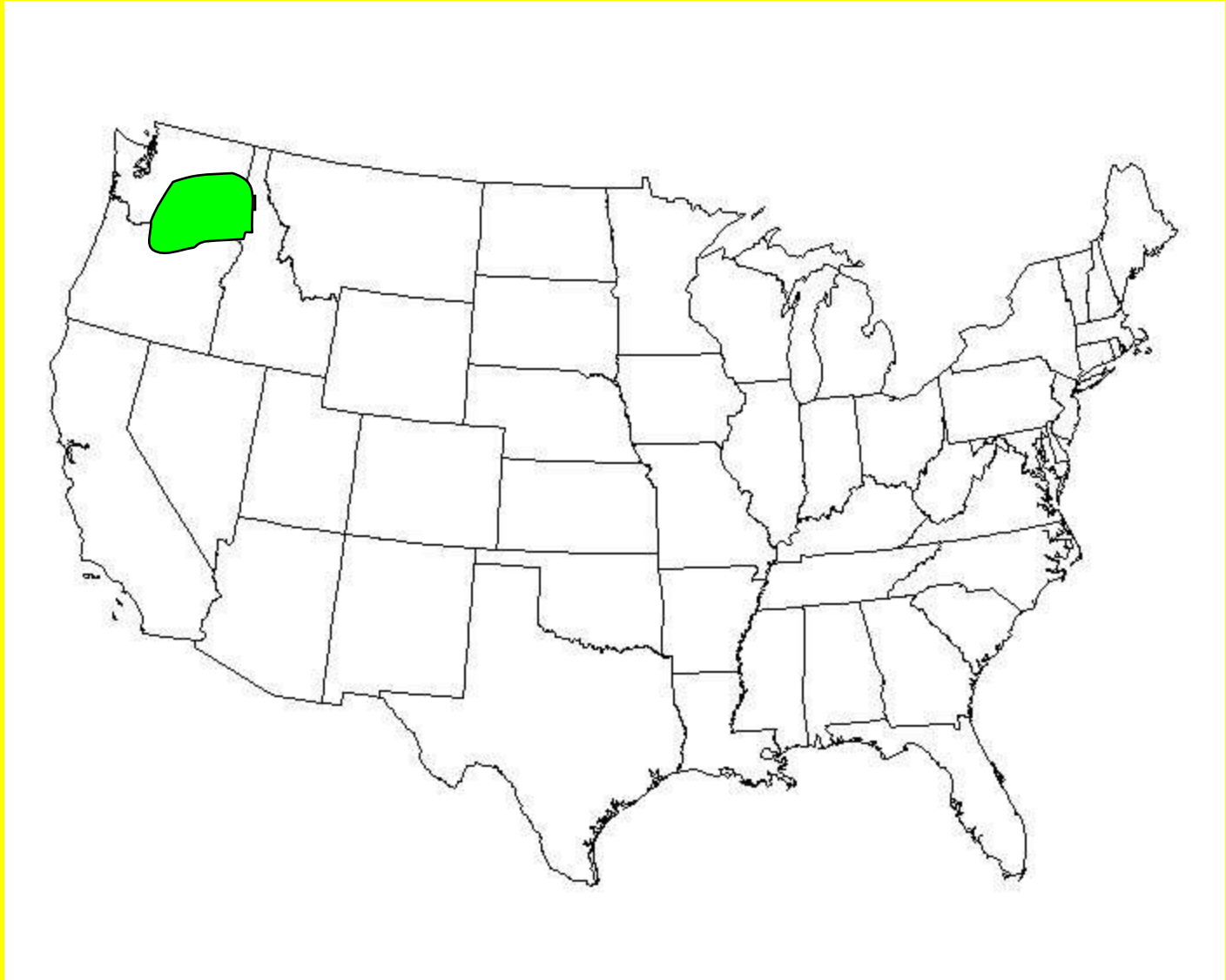
# Implications of CGP Climate for JGG Control

- Dryland cropping systems are ww-sc-f or ww-f. Including a late spring-planted crop works well where pptn. is adequate.
- Clearfield® wheat has good acceptance in drier regions. Effectiveness can be limited by dry spring conditions.
- Severe weather, such as hail, can reduce crop competitiveness. (2001 22 plants/m<sup>2</sup>, 2002 720 plants/m<sup>2</sup> G. Wicks-NE)

# Implications of CGP Climate for JGG Control

- Destruction of weed seedlings in the fallow year is very weather dependent.
- Practices to enhance competitiveness of the crop work well if combined and used over several years.
- Minor use of inversion (moldboard plow) tillage.

# Pacific Northwest Wheat Cropping Region

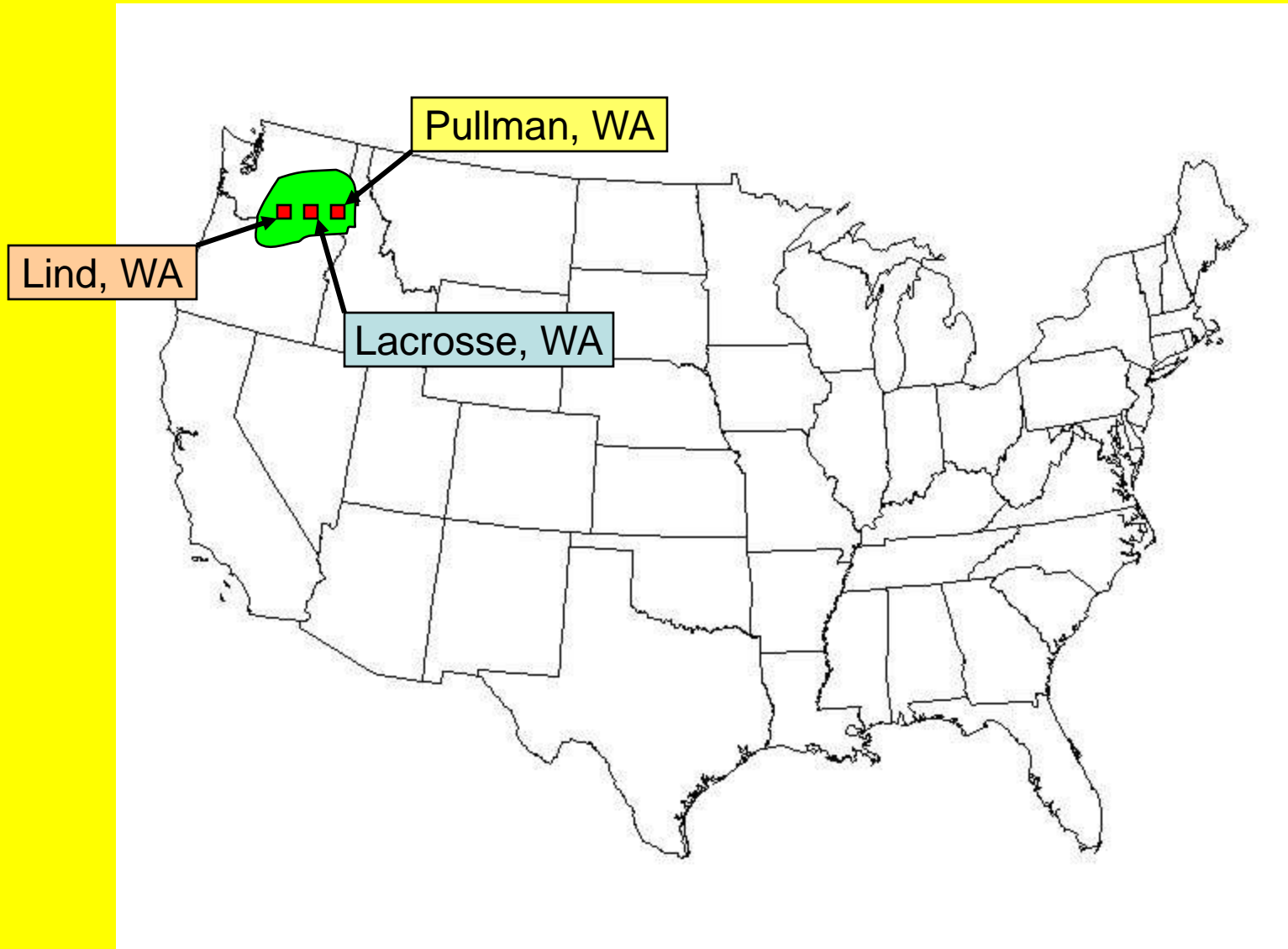








# Pacific Northwest Wheat Cropping Region



- Winter precipitation pattern, with  $\approx 75\%$  of annual pptn. received October-April.
- July and August especially dry.  
(Average July rainfall in Pullman is 0.5")
- Region described by "annual pptn. areas."  
Pullman  $\approx 21$ "   Lacrosse  $\approx 16$ "   Lind  $\approx 9.5$ "
- Pptn. varies greatly over short distances.  
East to west lose 1" pptn. every 10 miles.

- Cropping system based on winter wheat, but varies according to “precipitation area”  
High ww-sg-leg Inter. ww-sg-f Low ww-f
- Moderate temperatures during grain fill allow amazing grain production relative to precipitation.
- Precipitation varies year-to-year, and varies by month between years.  
(Lind, 1997 15”, 1994 6.9”)

# Implications of PNW Climate for JGG Control

- Use of late spring-planted crops not an option.
- Plowing is not an option in the low rainfall area.
- Clearfield® wheat can be used, effectiveness may be limited by variations in temperature or precipitation. (Lacrosse 2002 crop damage, poor jgg control F. Young)

# Implications of PNW Climate for JGG Control

- **Even more than in the CGP or SGP, climatic conditions in the PNW dictate use of a multi-practice approach.**

When the most effective practice (crop rotation using a late spring-planted crop) isn't available, the combined effects of numerous other practices must be used.

## Final Thoughts

- A key factor in the success of the NJGGRP has been a willingness to look at multiple solutions to a problem.
- From a producer perspective, a great deal of public policy is currently driven by a single solution, no-till; something that does not fit all regions or all farmers.
- By maintaining a willingness to objectively evaluate multiple solutions, the weed science community has much to offer in the development of sound future policy for agriculture and the nation.