



Corn Profitability...

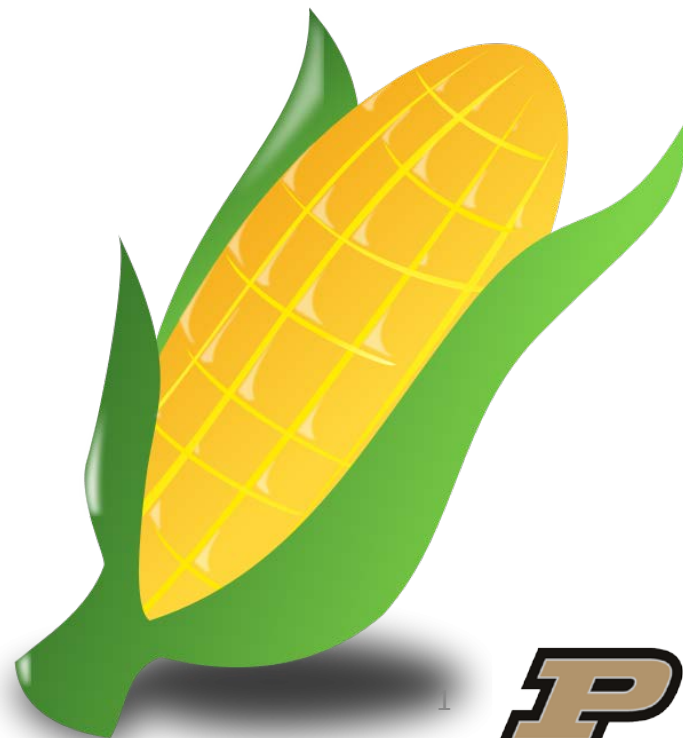
Between a Rock and a Hard Place

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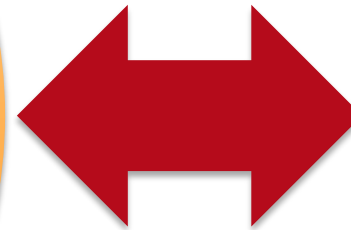
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The challenge today...

COST
PER
BUSHEL



Price
per bu

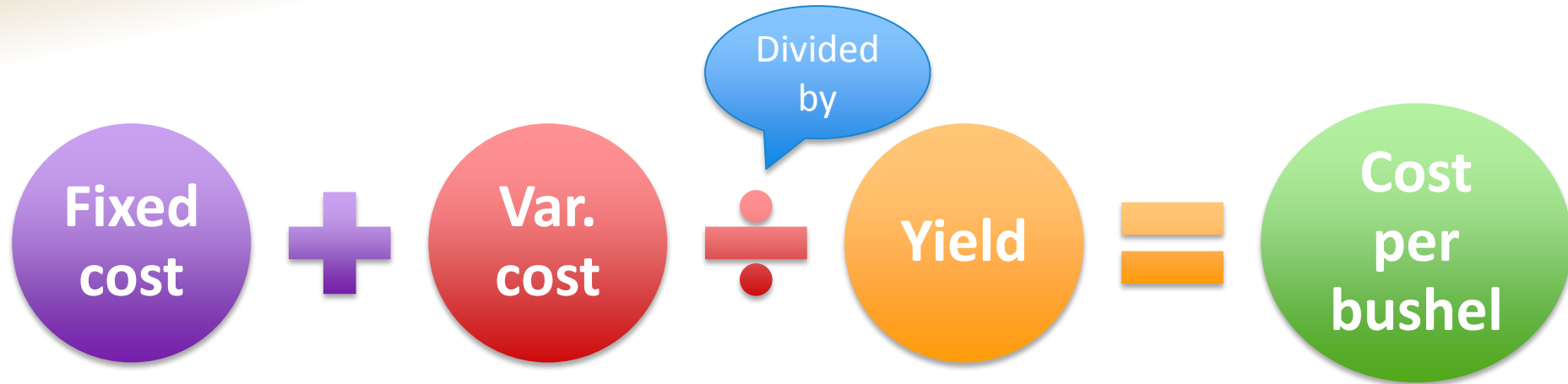
Profit (Loss) for Rotation Corn, Indiana

ID-166-W, Purdue Crop Cost & Return Guide



		General soil productivity		
		Low	Average	High
Yield:		136	170	204
Variable costs:		\$378	\$418	\$436
Variable cost/bu:		\$2.78	\$2.46	\$2.14
Fixed Costs for 1000-ac corn/soy operation				
Machinery ownership:		\$122	\$122	\$122
Family / hired labor:		\$78	\$78	\$78
Land:		\$149	\$194	\$244
Total cost/bu		\$5.35	\$4.51	\$3.85
Grain price per bu:		\$3.70		
Profit (Loss) per acre:		-\$223.80	-\$138.00	-\$30.20

Total cost per bushel can be reduced...



- Decreasing fixed costs of production
- Decreasing variable costs without significantly reducing yield
- Increasing yield without significantly increasing variable costs

Variable Input Costs

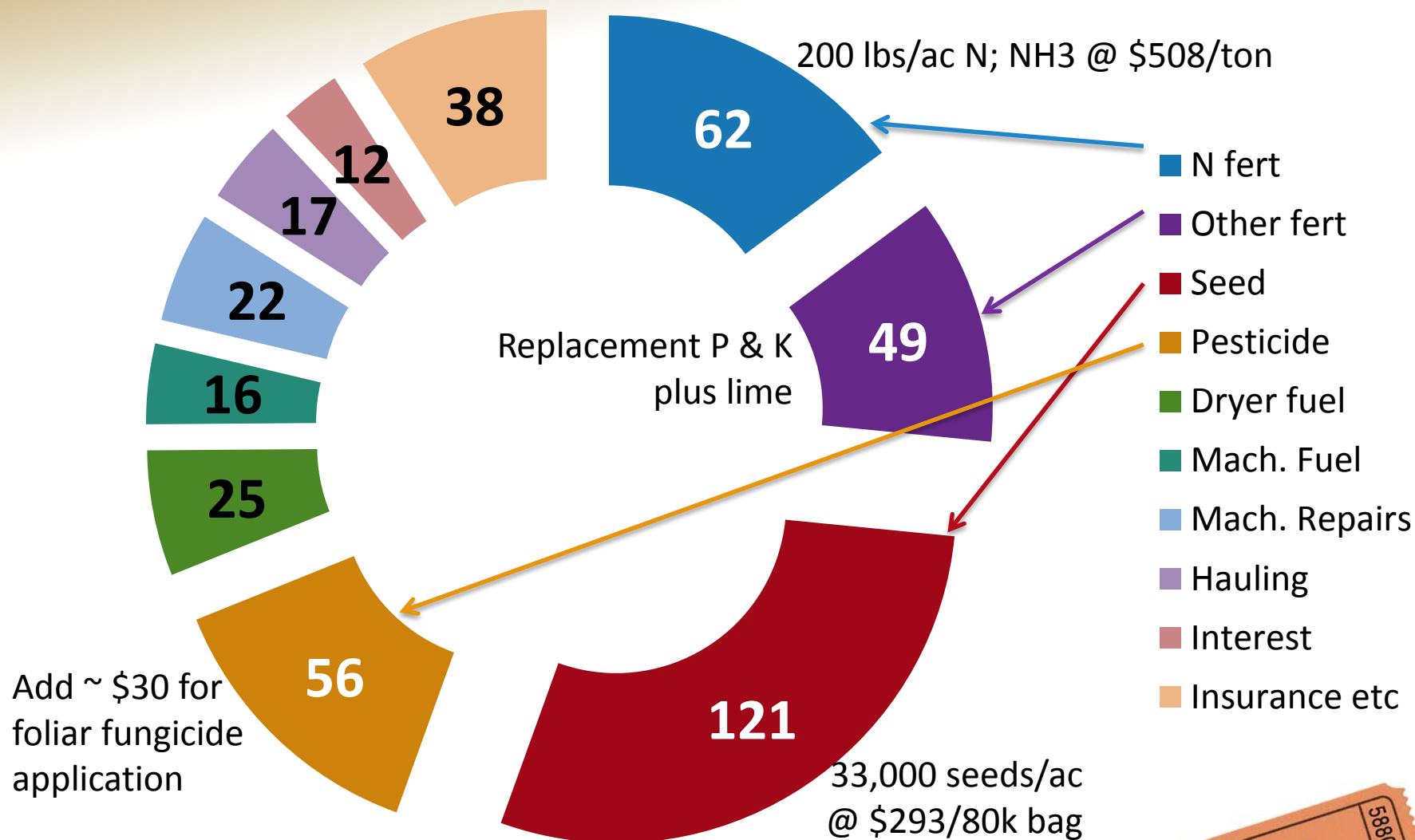


- Fertilizer
 - Lime, N, P, & K
- Seed
 - Cost / bag & rate
- Pesticides

**Approx. 70% of total
variable costs for
rotation corn in
Indiana**

**Even higher if foliar
fungicide is used**

Variable Costs for Rotation Corn on Avg. Productivity Soils



Source: Dobbins et al. 2017 Purdue Crop Cost & Return Guide, ID-166-W (Oct '16)



Nitrogen cost per bushel

- Cost varies among N fertilizer sources by upwards of \$0.10 per bushel
 - Cost per lb N: AA < Urea < UAN

Anhydrous	N cost/lb	28% UAN	N cost/lb	32% UAN	N cost/lb	Urea	N cost/lb
\$350	\$0.21	\$125	\$0.22	\$125	\$0.20	\$250	\$0.27
\$400	\$0.24	\$150	\$0.27	\$150	\$0.23	\$300	\$0.33
\$450	\$0.27	\$175	\$0.31	\$175	\$0.27	\$350	\$0.38
\$500	\$0.30	\$200	\$0.36	\$200	\$0.31	\$400	\$0.43
\$550	\$0.34	\$225	\$0.40	\$225	\$0.35	\$450	\$0.49
\$600	\$0.37	\$250	\$0.45	\$250	\$0.39	\$500	\$0.54
\$650	\$0.40	\$275	\$0.49	\$275	\$0.43	\$550	\$0.60
\$700	\$0.43	\$300	\$0.54	\$300	\$0.47	\$600	\$0.65
\$750	\$0.46	\$325	\$0.58	\$325	\$0.51	\$650	\$0.71
\$800	\$0.49	\$350	\$0.63	\$350	\$0.55	\$700	\$0.76
\$850	\$0.52	\$375	\$0.67	\$375	\$0.59	\$750	\$0.82
\$900	\$0.55	\$400	\$0.71	\$400	\$0.63	\$800	\$0.87

Soil N loss occurs in wet soils either by denitrification (heavier soils) or leaching (sandy soils).



Consequently, N cost per bu increases if yields are reduced or you over-apply N fertilizer to avoid yield loss.



Minimize risk of N losses..

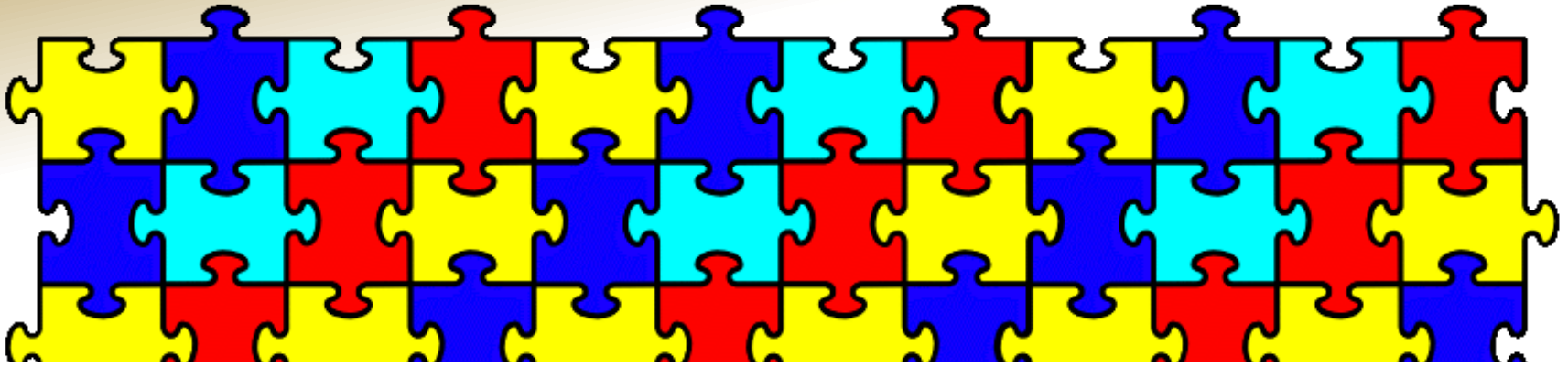
- Improve tile or surface drainage to reduce risk of soil nitrate-N losses
 - Focus on late pre-plant N applic's, split-applic's (pre-plant + sidedress), full sidedress, or fertigation N applic's
 - Include inhibitors where appropriate
- Avoid fall-applied anhydrous ammonia
 - Avoid early spring (March) N applic's
 - Avoid UAN or urea broadcast without incorporation (i.e., volatilization loss)

The “right” rate of N fertilizer varies year by year because...



...grain price & N cost vary year to year
AND
...the available soil N varies year by year.

Predicting the “right” N rate every year...



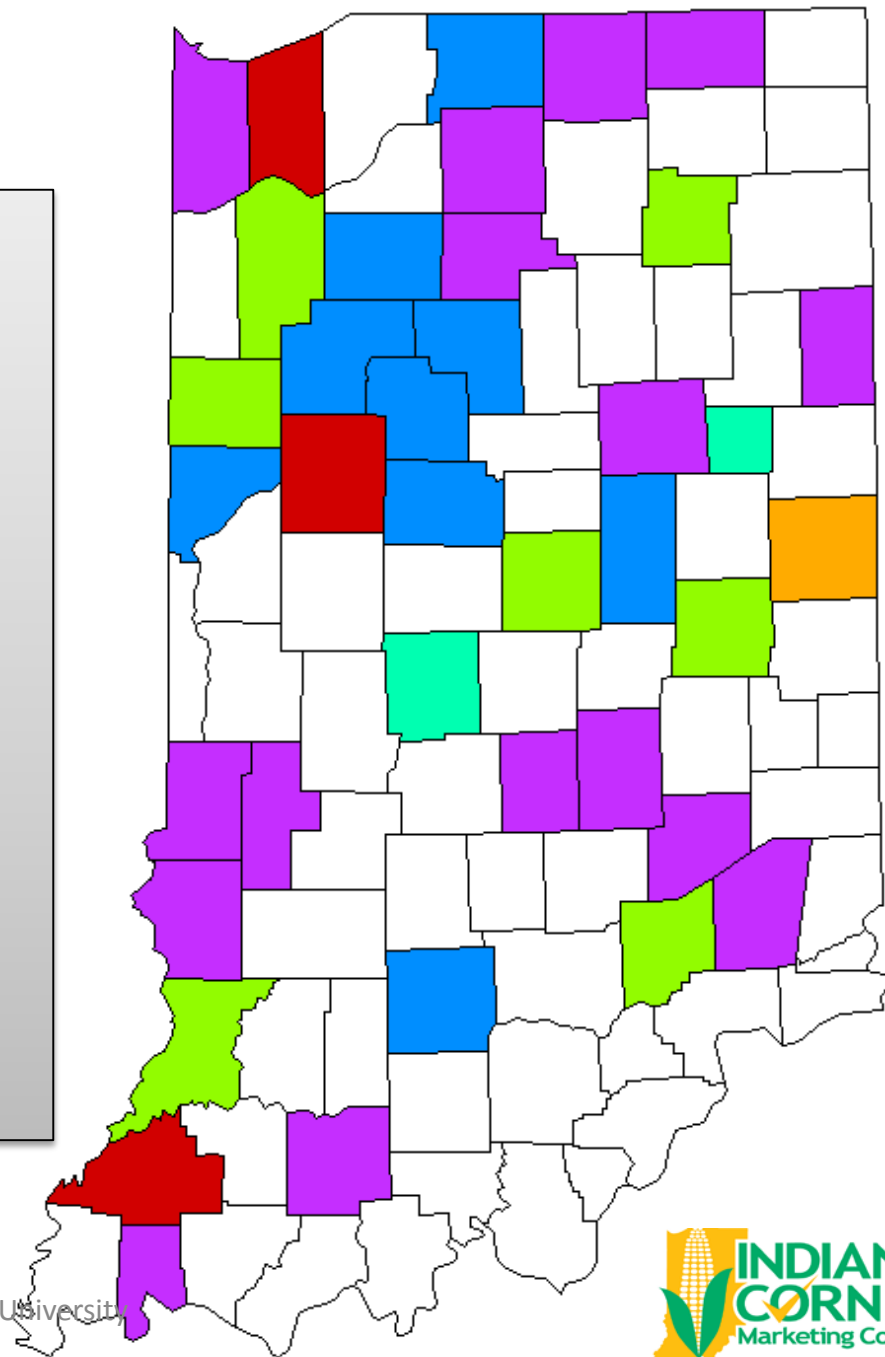
- ...is a challenging puzzle because it is difficult to accurately predict soil N levels.
 - Soil tests have their limitations.
 - Stalk nitrate sampling has its limitations.
 - Nitrogen models have their limitations.
 - Crop reflectance tools have their limitations.

So, is there a practical alternative?

Even though soil N availability varies year to year, we can use the results of sound field research to identify good “ballpark estimates” of optimum N rates that best maximize dollar returns.

Field scale trials

- More than 250 field scale trials since 2006
 - 60% are farmer trials
 - Most are sidedress
 - About 80% UAN
 - 76% rotation corn
 - 12% sandy soils
 - 4% irrigated



Summary available online...

www.kingcorn.org/news/timeless/NitrogenMgmt.pdf

Purdue University Department of Agronomy

Applied Crop Research Update

Updated May 2016

URL: <http://www.kingcorn.org/news/timeless/NitrogenMgmt.pdf>

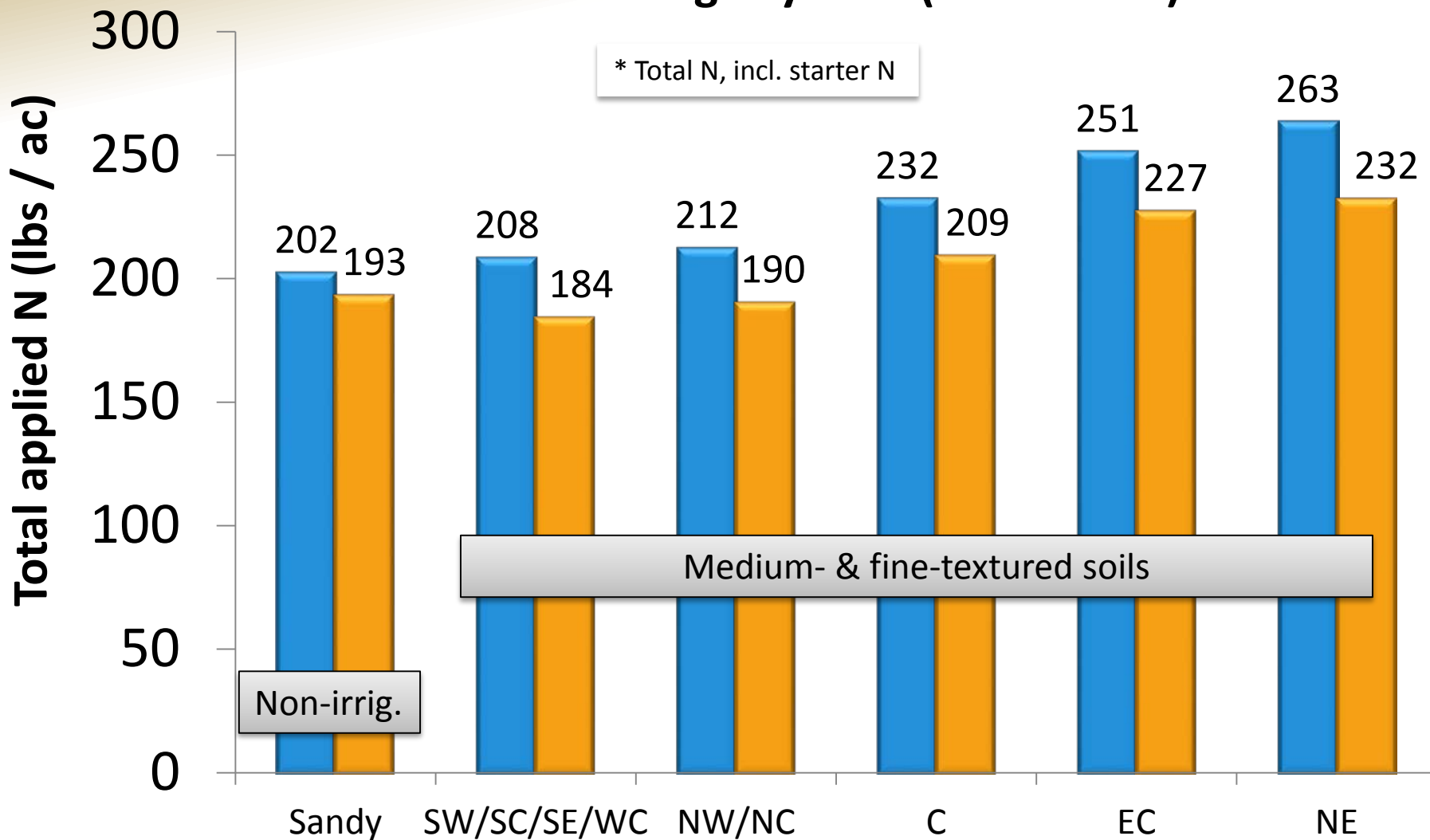
Nitrogen Management Guidelines for Corn in Indiana

Jim Camberato¹ and RL (Bob) Nielsen
Agronomy Department, Purdue Univ., West Lafayette, IN

Agronomic vs. Economic N Rates*



Corn following soybean (no manure)



Camberato & Nielsen, Purdue, ~ 180 trials statewide, 2006 – 2015

\$3.50 corn, \$0.30 N

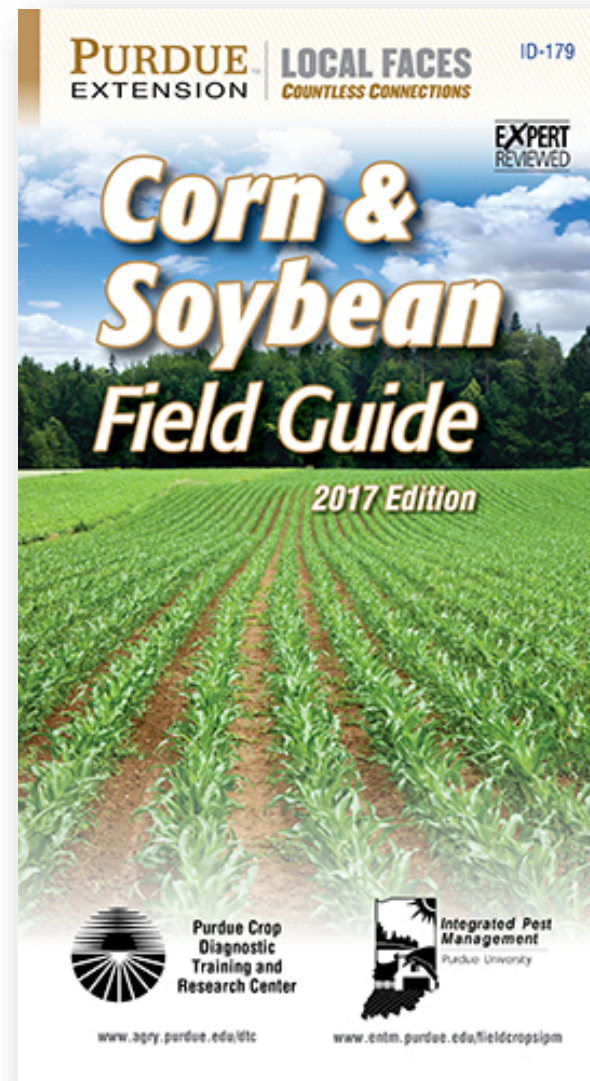


TRI-STATE
FERTILIZER RECOMMENDATIONS
FOR
CORN,
SOYBEANS,
WHEAT
&
ALFALFA

Michigan State University
The Ohio State University
Purdue University

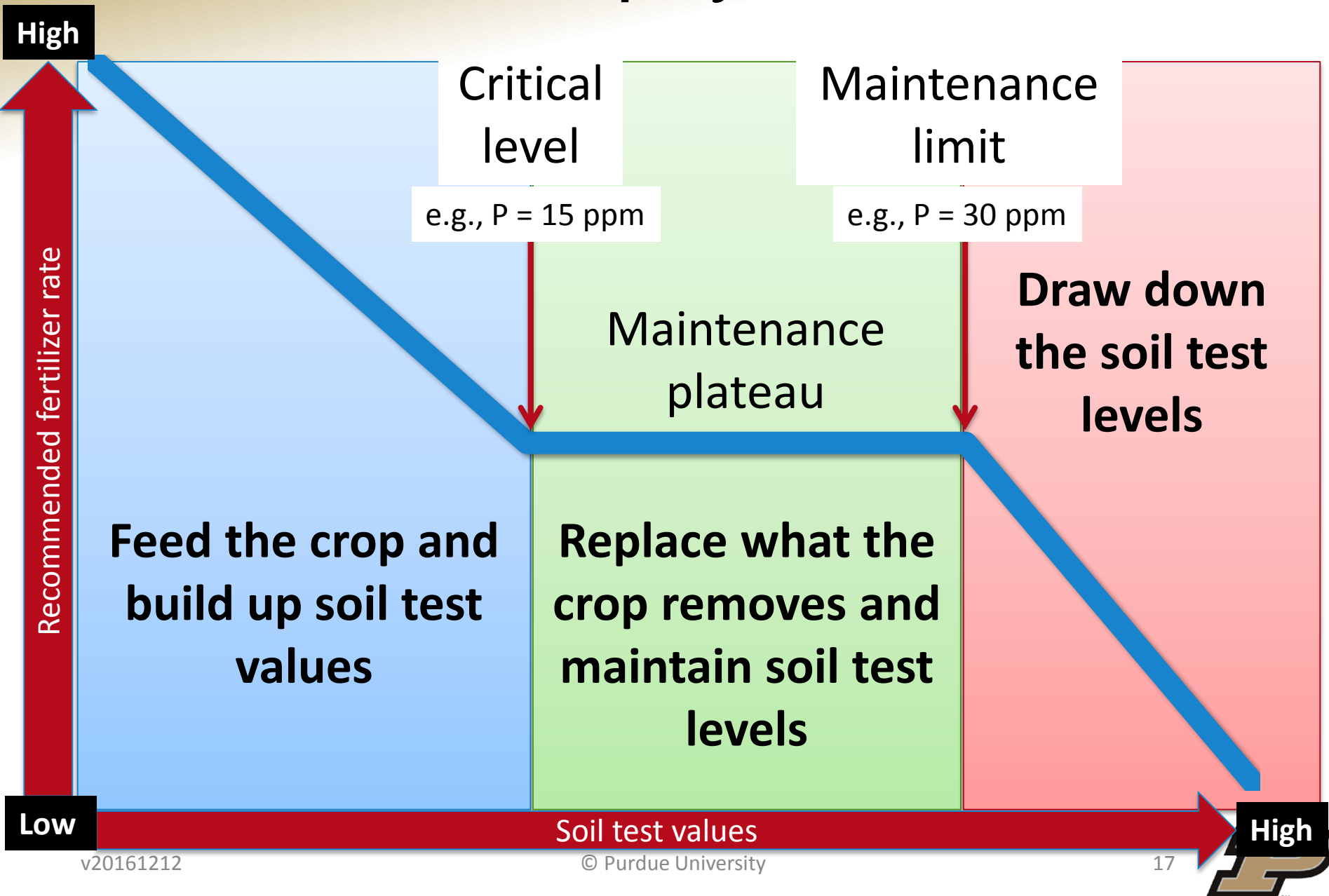
In Search of Profits...

**CONSIDER DELAYING
P & K APPLICATIONS**



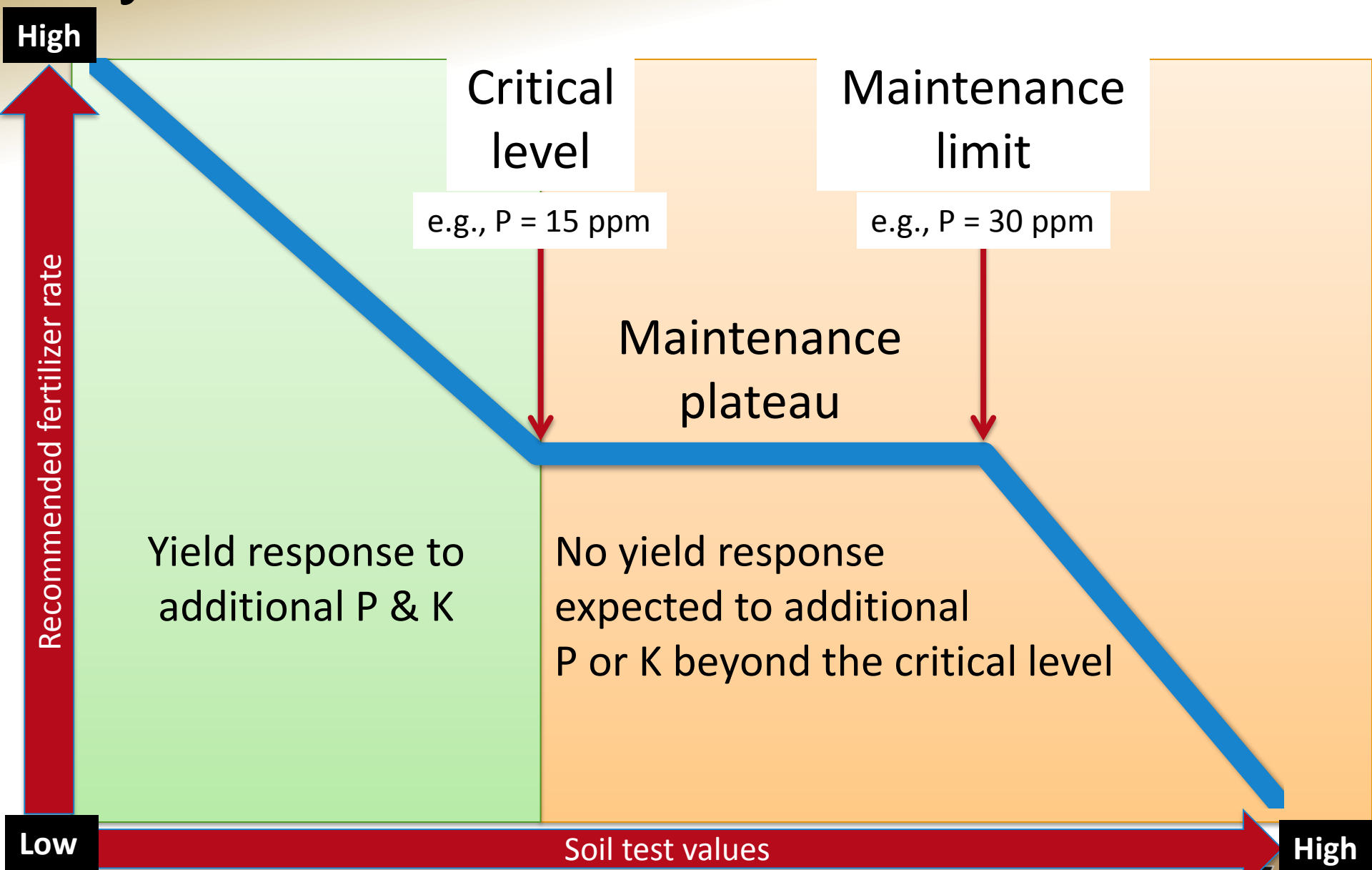
Soil Test Philosophy

Tri-State Fert. Recs.



Key consideration...

Tri-State Fert. Recs.



So, when \$\$ are limited...

- Applications of P and K fertilizers can be delayed with little risk of yield loss, IF....
 - Soil sampling has been done within the last few years... AND...
 - Soil test nutrient levels are WELL within the maintenance ranges or beyond.
- Soil test levels for P and K change slowly, so there is little risk of fields rapidly becoming deficient.

In Search of Profits...

SEED COST



Seed catalog, ca. 1913, Source: <http://smithsonianlibraries.si.edu>

Seed cost PER ACRE is influenced by cost per bag and seeding rate

	Seeding rate		
\$\$ / bag	25,000	30,000	35,000
\$100	\$31.25	\$37.50	\$43.75
\$150	\$46.88	\$56.25	\$65.63
\$200	\$62.50	\$75.00	\$87.50
\$250	\$78.13	\$93.75	\$109.38
\$300	\$93.75	\$112.50	\$131.25

Seed cost PER BUSHEL is more difficult to predict

- Key considerations...
 - Cost per bag of seed
 - Transgenic traits?
 - Genetic yield potential
 - Genetic stress tolerance
- Other considerations
 - Seed quality
 - Customer service



Seed catalog, ca. 1913, Source: <http://smithsonianlibraries.si.edu>

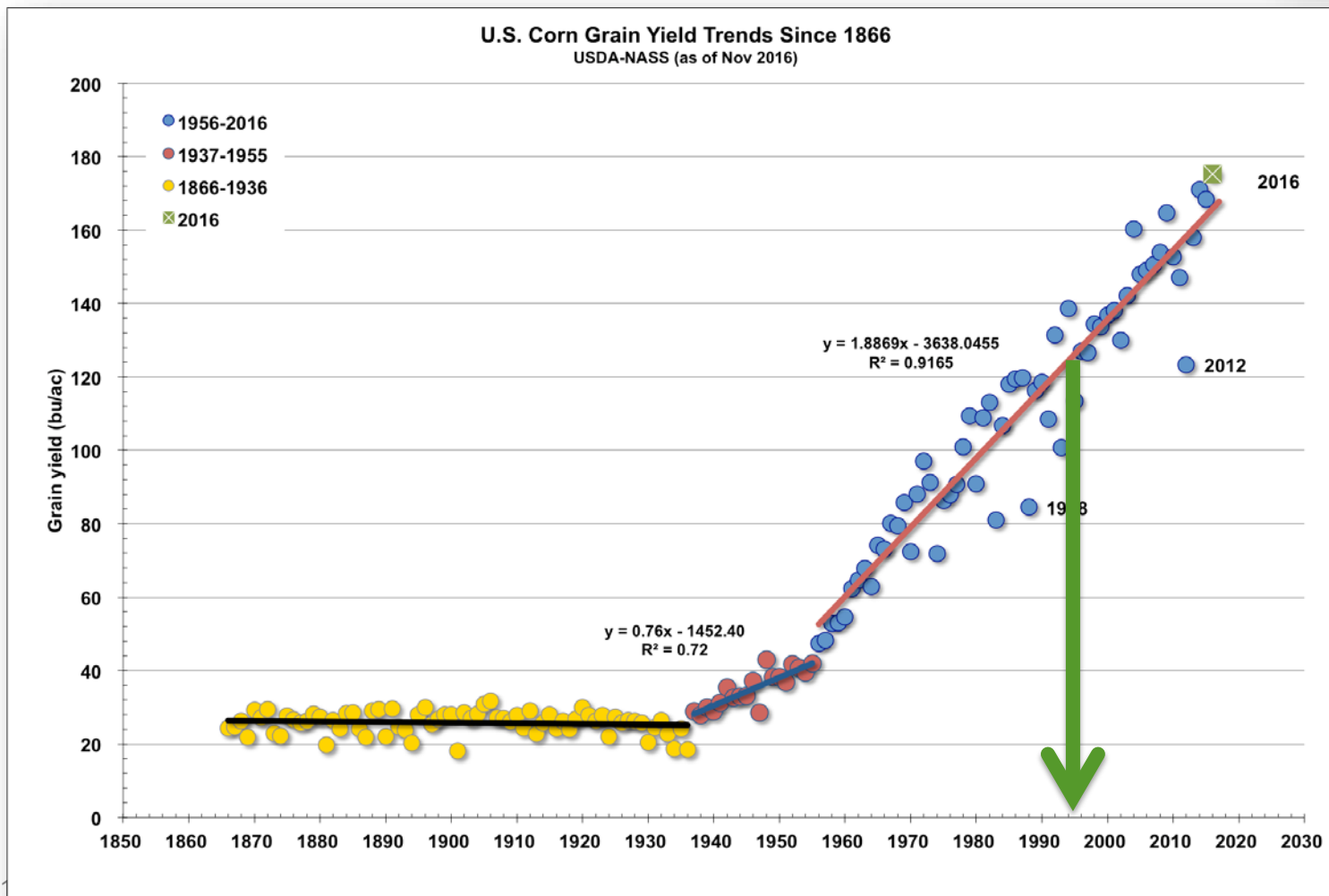
Non-GMO hybrids are cheaper: Risky or not?



Not an easy answer...



- After all, there is no clear yield advantage to transgenics



Not an easy answer...



- No clear yield advantage to transgenics
- Insect-resistant transgenics (Bt traits) target mainly rootworm & European corn borer; lesser control for earworms or Western bean cutworm.
 - Predicting need for control is difficult
- Herbicide tolerant transgenics (glyphosate, glufosinate) broaden weed control options

If the Bt lingo confuses you...



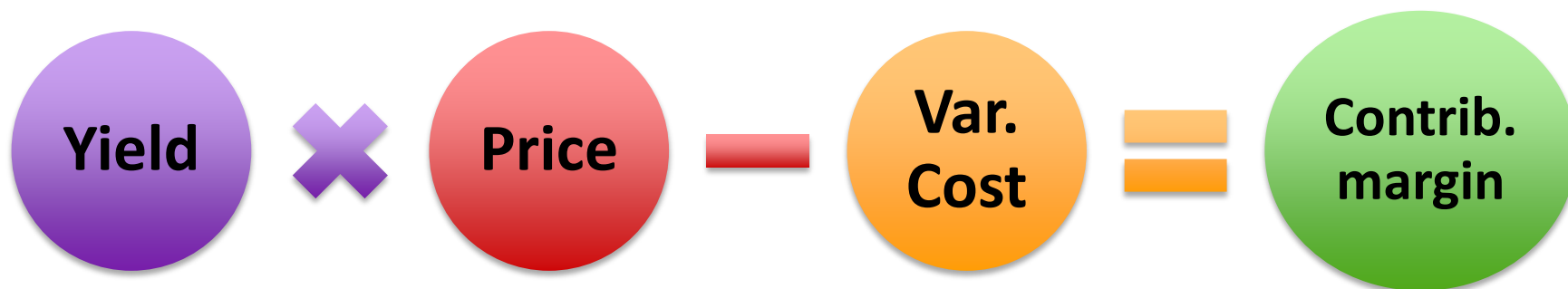
April 2016
Bulletin posted at
www.msuent.com

Handy Bt Trait Table

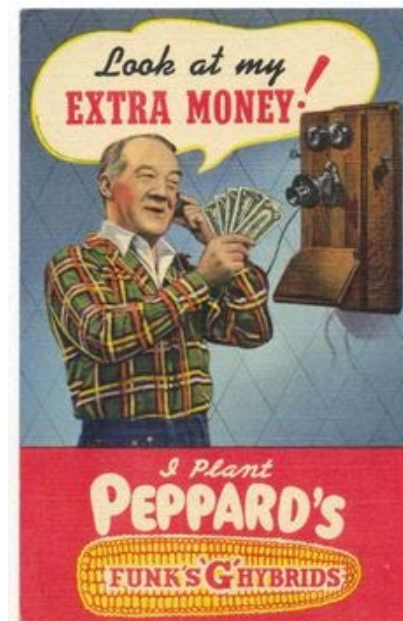
With questions or corrections, contact:
Chris DiFonzo, Field Crops Entomologist
Michigan State University, East Lansing, MI

<http://www.msuent.com/extension>

Remember that hybrid selection influences both yield and variable cost...



- Your ability to identify “good” hybrids can easily add 20 to 30 bu/ac to your bottom line.
- Do not underestimate the importance of this agronomic decision.



Hybrid selection is not simply about genetic yield potential

- But, also the ability of hybrids to perform consistently well across a wide range of growing conditions (i.e., stress tolerance).
- Tolerance to a wide array of stresses is important because we cannot accurately forecast next year's growing conditions.

A Good Indicator of Hybrid Stress Tolerance:

- Hybrid performance in as many variety trials as you can find within a given geographic region.
 - Multiple trials provide a range of growing conditions that your fields may experience in the future.
- Look for hybrids that consistently yield near the top of the majority of the trials.

Hybrid traits & Crop resilience

- Emergence & seedling vigor
 - Early season soils often wetter & cooler
- Resistance to important diseases
 - Seedling disease, stalk & ear rots
 - Excellent foliar disease resistance minimizes the need for foliar fungicide
- Stalk & root health
- Overall stalk strength
- Drought tolerance
- Overall stress tolerance

Reduce seed costs by choosing seeding rates wisely



Purdue plant population trials...

- Since 2008, we've conducted ~ 90 field scale trials around the state.
 - Majority were on-farm trials.
 - Trials ranged in size from 30 to 100 acres.
 - Various hybrids, but 27 trials were split-planter hybrid comparisons, purposefully chosen.
- Few irrigated trials
 - But honestly, response is probably similar to high-yield rain-fed conditions



Summary available online...

www.kingcorn.org/news/timeless/SeedingRateGuidelines.pdf

Purdue University Department of Agronomy

Applied Crop Production Research Update

Updated May 2016

URL: <http://www.kingcorn.org/news/timeless/SeedingRateGuidelines.pdf>

Yield Response of Corn to Plant Population in Indiana

RL (Bob) Nielsen, Jason Lee, John Hettinga, & Jim Camberato

Agronomy Department, Purdue University

West Lafayette, IN 47907

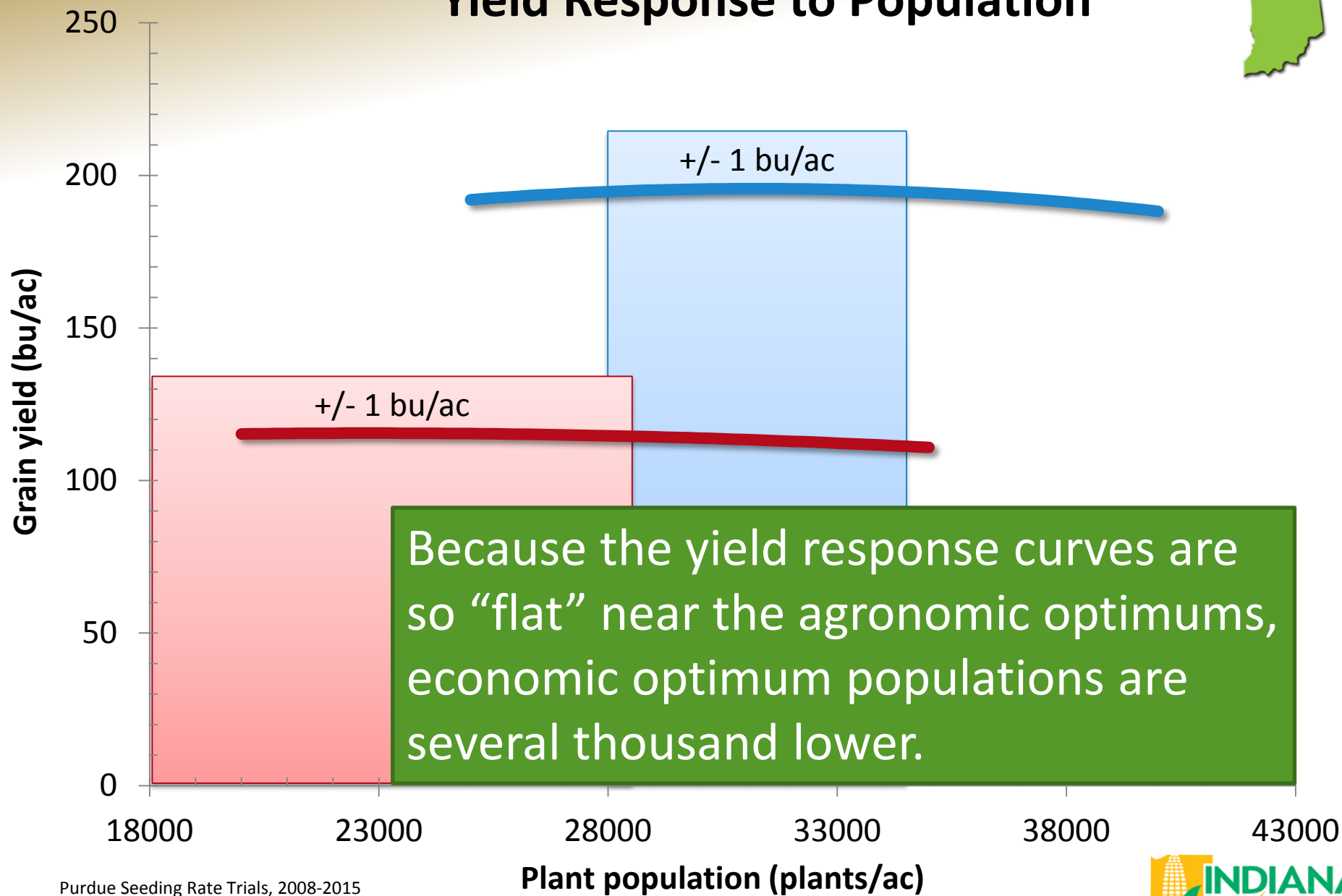
Nielsen's email: rnielsen@purdue.edu

Bottom line on plant population

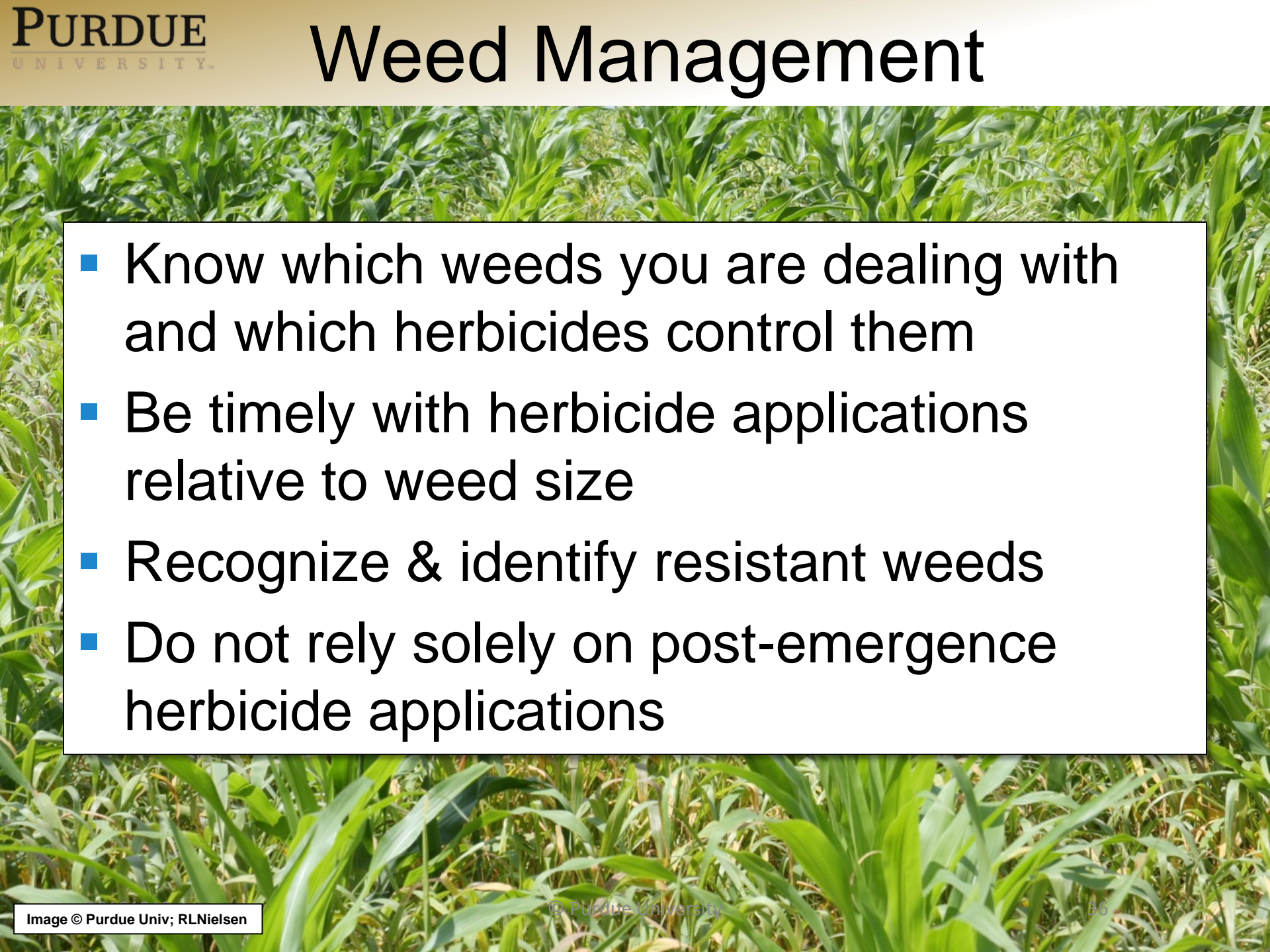
- Two “sweet spots” for plant population that maximize corn yield in Indiana.
 - Challenging soils: Low 20’s FINAL stand
 - Routinely yielding less than ~ 130 bu/ac
 - Productive soils: Low 30’s FINAL stand
 - Within range of ~ 140 to 240 bu/ac
- However, considering that seed ranges from \$2.50 to \$3.75 per thousand seed...



Yield Response to Population



Weed Management

- 
- A photograph of a lush green cornfield with rows of corn plants stretching into the distance under bright daylight.
- Know which weeds you are dealing with and which herbicides control them
 - Be timely with herbicide applications relative to weed size
 - Recognize & identify resistant weeds
 - Do not rely solely on post-emergence herbicide applications

REPEATED USE OF HERBICIDES WITH THE SAME SITE OF ACTION CAN RESULT IN THE DEVELOPMENT OF HERBICIDE-RESISTANT WEED POPULATIONS.

This chart groups herbicides by their modes of action to assist you in selecting herbicides **1)** to maintain greater diversity in herbicide use and **2)** to rotate among effective herbicides with different sites of action to delay the development of herbicide resistance.



This chart lists premix herbicides alphabetically by their trade names so you can identify the premix's component herbicides and their respective site-of-action groups. Refer to the **Site-of-Action** chart on the left for more information.

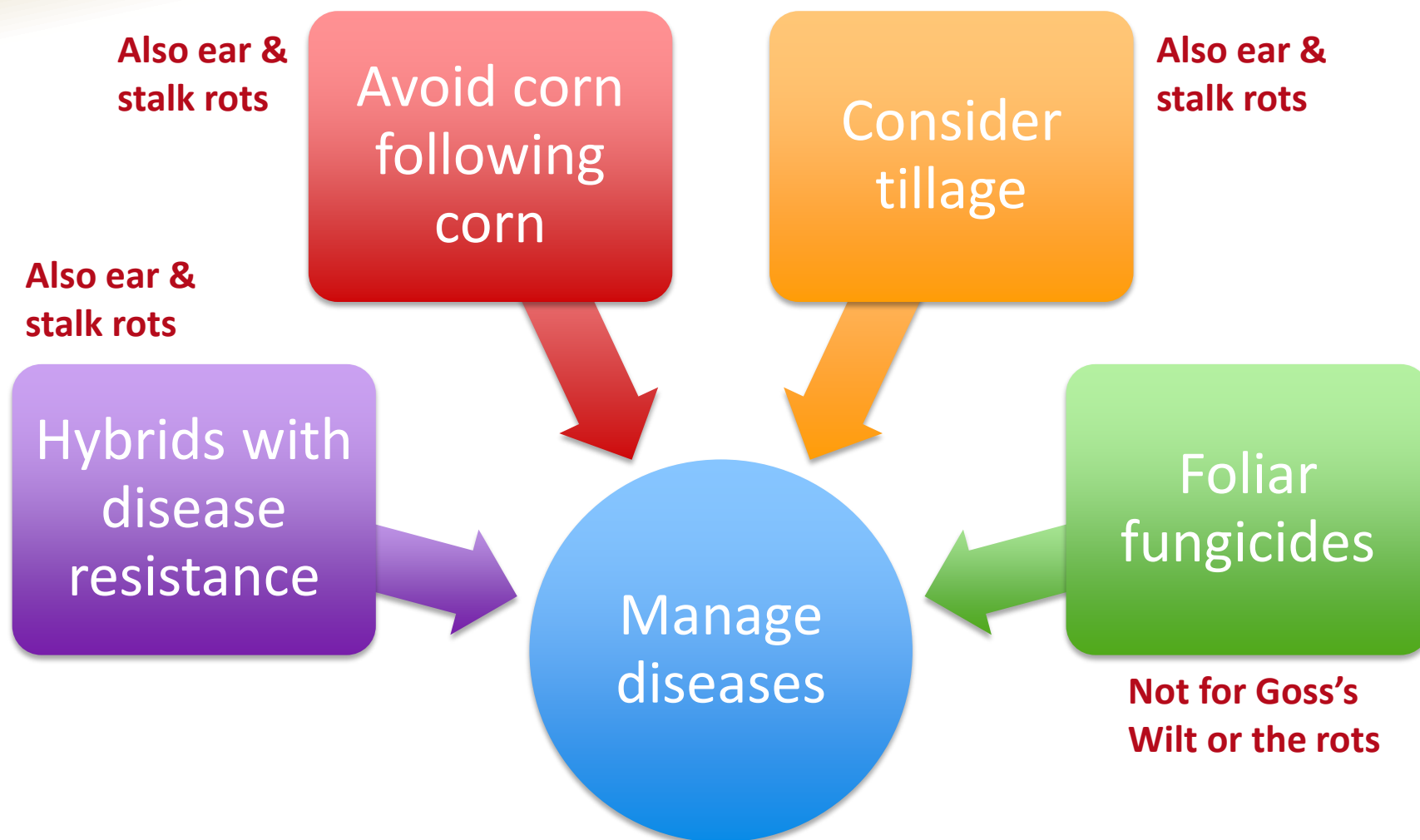
SITE-OF-ACTION GROUP				NUMBER OF RESISTANT WEED SPECIES IN U.S.	COMPONENT			COMPONENT				
SITE OF ACTION				CHEMICAL FAMILY	ACTIVE INGREDIENT	PRODUCT EXAMPLES (TRADE NAME [®])	PREMIX	ACTIVE INGREDIENT	TRADE NAME [®]	PREMIX	ACTIVE INGREDIENT	TRADE NAME [®]

<https://goo.gl/VdWofU>

Disease Management

- Know your diseases, send samples to PPDL to confirm diagnoses
- Most important foliar diseases for corn in Indiana are GLS, NCLB, Goss's Wilt
- Ear rots (diplodia, gibberella, fusarium) are also common problem
- Stalk rots often a problem when grain fill conditions are challenging
- Almost all overwinter on old corn residues

Minimize risk of foliar diseases



In search of profits

MINIMIZE HARVEST LOSSES

1 bushel =
12 kernels in a
30" by 30" square

20 to 25 bu/ac loss >>>>>>

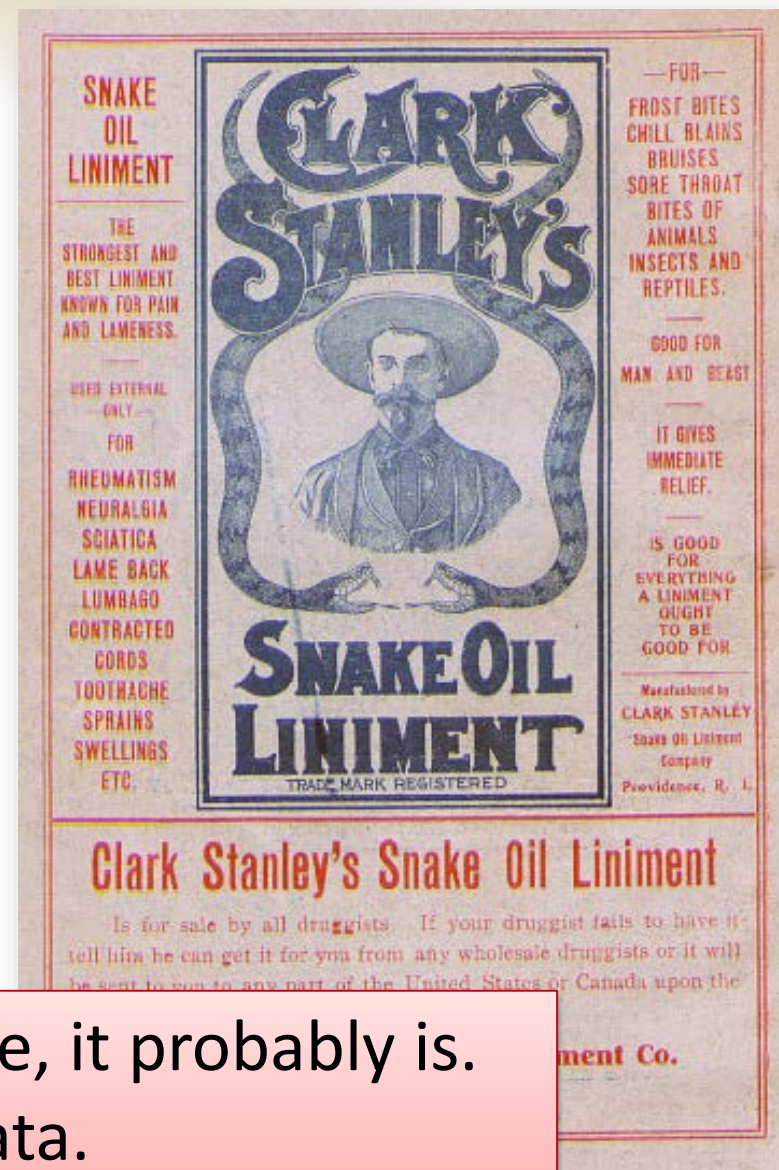




In search of profits

AVOID UNNECESSARY INPUTS

- If it sounds too good to be true, it probably is.
- Ask for comprehensive trial data.
- If in doubt, contact a reputable agronomist.



Increasing crop resilience against extreme weather involves...

- Identification & mitigation of field-specific Yield Limiting Factors (YLFs)
- Sound agronomic decision-making