

PURDUE
UNIVERSITY.

Purdue's Collaborative
On-Farm Research Program

RL (Bob) Nielsen & Shaun Casteel
Purdue Agronomy

Presentation handout available at:
<http://www.agry.purdue.edu/ext/ofr>

Prepared for the 2010 Indiana CCA Conference, Indianapolis, 14 Dec 2010

PURDUE
UNIVERSITY.

Outline


- Opportunities & Challenges w/ OFR
- 2010 Project Descriptions & Summaries
- 2011 Proposed Project Descriptions

v20101213 © 2010 Purdue Univ. 2

PURDUE
UNIVERSITY.

Why Do Research?

- To come up with a **fact-based ANSWER** to a question for which no sound answer previously existed.
- Then use that answer to **predict FUTURE** performance or response of the crop to some change in management practices.




v20101213 © 2010 Purdue Univ. 3

PURDUE
UNIVERSITY

Why Do **On-Farm** Research?

- Similarly, to **ANSWER** a question for which no answer previously existed.
- Secondly, to **VALIDATE** previously discovered answers for a question of interest to you.
- Thirdarily, to **CONVINCE** yourself that some alternative management practice is profitable for your own conditions.





v20101213 © 2010 Purdue Univ. 4

PURDUE
UNIVERSITY

“Players” in OFR Trials

- Purdue campus Extension specialists
- Indiana farmers
- Local Purdue Extension Ag. Educators
- Local Certified Crop Advisers
 - Seed, chemical, & fertilizer CCAs
 - Independent crop consultants



v20101213 © 2010 Purdue Univ.

PURDUE
UNIVERSITY

Traditional small plot research

- Targets a small, uniform experimental area with the hope of minimizing background “noise” to enhance our ability to detect true & repeatable treatment effects.
- Allows many treatments to be evaluated per acre of research area.
- Often requires specialized or small-scale research plot equipment.



Source of image: <http://www.usda.gov/oc/photos/0161431.jpg>

v20101213 © 2010 Purdue Univ. 7

PURDUE
UNIVERSITY

On-farm research...

- Targets “real world” fields that, by their nature, are typically more variable.
- Limits the number of treatments evaluated per acre due to the larger plot size (equipment width by length of field).
- Accommodates commercial-scale field equipment & yield monitoring.




Image source: Deere.com

v20101213 © 2010 Purdue Univ. 8

PURDUE
UNIVERSITY

On-farm research today...


- Is made possible by developments in precision ag technologies that greatly facilitate the logistics on the part of the collaborating farmer.
 - Yield monitors, grain carts w/ weigh scales, auto-steer navigation, variable rate controllers, GPS field mapping & plot design, GIS software to aid the analysis of yield monitor data.

v20101213 © 2010 Purdue Univ. 9

PURDUE
UNIVERSITY

Easier logistics for the grower...

- Means that we can strike a better balance between statistical robustness of the experimental design of the trial and the logistical headaches of the collaborating farmer.



v20101213

PURDUE
UNIVERSITY

Small plot vs On-farm research...

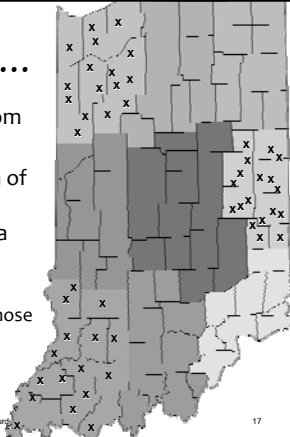
Small Plot	Large Plot
<ul style="list-style-type: none">• Large # of treatments• Uniform field• Moderate to large C.V.• Specialized equipment• ANSWER & PREDICT	<ul style="list-style-type: none">• Few # of treatments• Field variation is ok and can even be a positive• Relatively small C.V.• Farm-sized equipment• ANSWER, PREDICT, VALIDATE, PERSUADE

v20101213 © 2010 Purdue Univ. 11

PURDUE
UNIVERSITY

The power of OFR...

- Is not simply the result from an individual OFR trial.
- Rather, is the aggregation of results from multiple OFR trials to develop large area recommendations.
 - All Indiana soybean & corn growers benefit, not just those that participate in the OFR trials.

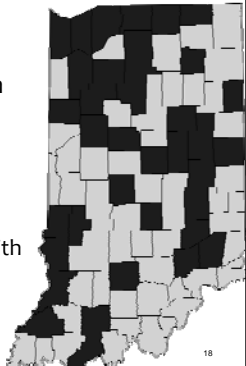


v20101213 © 2010 Purdue Univ. 17

PURDUE
UNIVERSITY

Purdue OFR since 2006...

- We have been involved with just over 100 on-farm trials or field-scale trials in 37 counties throughout Indiana.
 - Primarily N rate trials
 - Some seeding rate trials with corn and soybean




v20101213 © 2010 Purdue Univ. 18

PURDUE
UNIVERSITY

Challenges to collaborative OFR...

- Time involvement of “players”
- Logistics of field operations for growers
- Real or perceived costs for growers
- Communication among “players”
- Attention to detail
- Record keeping
- Note taking during season




v20101213 © 2010 Purdue Univ.

PURDUE
UNIVERSITY


2011 On-Farm Research Trials

- We aim to establish or continue OFR efforts with four production topics...
 - Nitrogen rates in corn
 - Seeding rates in corn & soybean
 - Foliar fungicides for corn
 - Seed nematicides for corn



v20101213 © 2010 Purdue Univ.

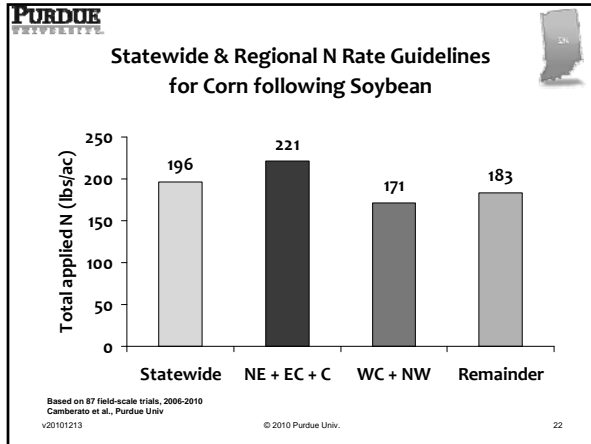
PURDUE
UNIVERSITY



Nitrogen rate trials

- Nearly 60% of our 140+ field-scale N rate trials since 2006 have been conducted in collaboration with on-farm cooperators.
- Data from these trials have helped develop reliable statewide and a few regional N rate recommendations.
 - But, we need more data from more areas of Indiana to develop additional regional or soil-specific recommendations.

v20101213 © 2010 Purdue Univ. 21



PURDUE
UNIVERSITY

Results published on-line

Purdue University Department of Agronomy
Applied Crop Research Update
Updated January 2010
URL: <http://www.kingcorn.org/news/timeless/NitrogenMgmt.pdf>

Nitrogen Management Update for Indiana
Jim Comberato¹, RL (Bob) Nielsen², Eric Miller³, & Brad Joern⁴
Agronomy Department, Purdue Univ., West Lafayette, IN

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

Plus presentations at numerous Extension programs, field days, & crop conferences around the state during the past 4 years.

© 2010 Purdue Univ. 23

PURDUE
UNIVERSITY

Corn seeding rate trials

- Seed companies have been aggressive in recent years with their marketing of ever higher seeding rates. Go figure!
- I wanted to emulate the success of our N rate trials to develop statewide and regional seeding rate recommendations for Indiana corn growers.
 - 13 OFR trials to date, ten in 2010.
 - Michigan line to Ohio River, east to west

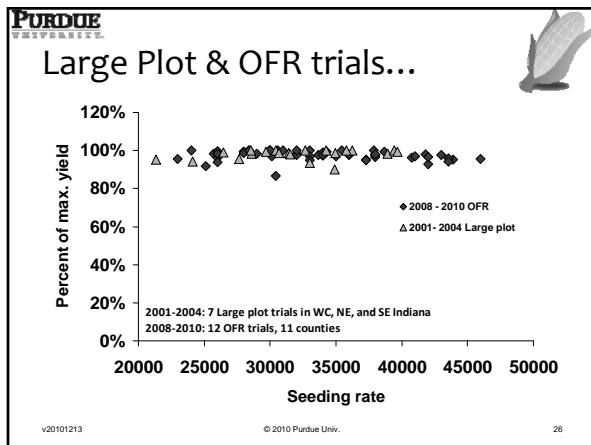
v20101213 © 2010 Purdue Univ. 24

PURDUE
UNIVERSITY

Seeding rate results: 2008-2010

- Among 11 OFR trials summarized to date:
 - Average opt. **seeding rate** = 27,500 spa
 - Ranging from 23,500 to 31,000 spa
 - Average grain yield = 189 bpa
 - Fascinating, considering \$3 per 1000 seed.
- Not enough OFR trials to place a lot of confidence in such unexpectedly low optimum seeding rates. Need more trials.

v20101213 © 2010 Purdue Univ. 25



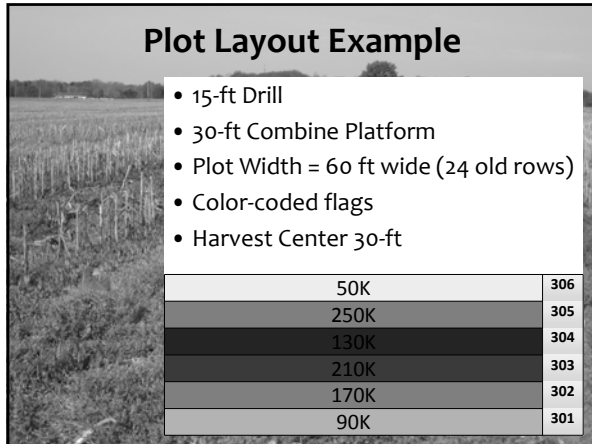
PURDUE
UNIVERSITY

Soybean Seeding Rates

- Target Range ~50K to 250K seeds/acre
 - 5 or 6 rates, for example:
55, 110, 165, 220, 275 K seeds/ac
- Replications – minimum of 3
- Length – minimum 300 ft
- Width – minimum ~2x combine width
- Data Collection – Seed drop, initial plant stand, harvest stand, yield

v20101213 © 2010 Purdue Univ. 28

Plot Layout Example



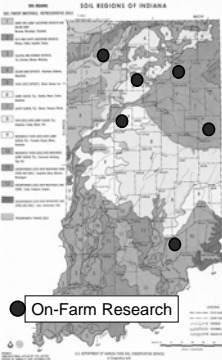
- 15-ft Drill
- 30-ft Combine Platform
- Plot Width = 60 ft wide (24 old rows)
- Color-coded flags
- Harvest Center 30-ft

50K	306
250K	305
130K	304
210K	303
170K	302
90K	301

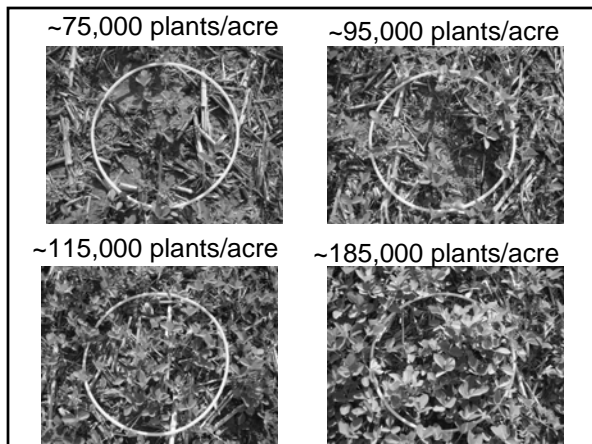
PURDUE
UNIVERSITY

2010 On-Farm Soybean Research


- **6 Seed Rate Studies**
 - LaPorte, Whitley, Jay, Jennings, Carroll, Fulton
- **4 Planting Date Studies**
 - LaPorte, Whitley, Jay, Jennings
- **3 Foliar BMP Studies**
 - LaPorte, Jennings, Tippecanoe




v20101213




~75,000 plants/acre




~95,000 plants/acre

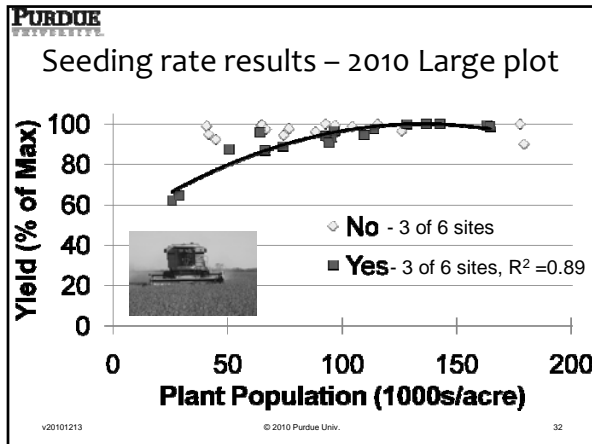


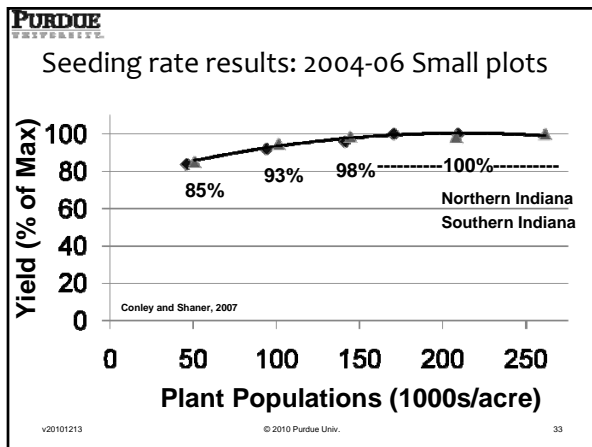
~115,000 plants/acre



~185,000 plants/acre







PURDUE
UNIVERSITY


2010 Soybean Plant Populations

- **Responsive Large Plots**
 - 95% Yield = 90,000 plants/acre
 - 100% Yield = 120,000 plants/acre (52.8 to 76.7 bu/ac)
- **Why were 3 of the 6 OFR sites Unresponsive?**
 - Top yields were 43.7 to 51.6 bu/ac (Low Yield Env't?)
 - Limiting soil moisture – too much or too little?
 - Overall soil productivity? Weather patterns? Others?
- **Need for more OFR trials to ANSWER the past and to PREDICT the future responses!**

v20101213 © 2010 Purdue Univ. 34

PURDUE
UNIVERSITY

Foliar fungicide trials




- Foliar fungicides have been aggressively marketed for corn in Indiana since 2007.
 - Greatest dollar returns to fungicide occur when applications are made at tassel / silking **IN RESPONSE TO DISEASE PRESENCE.**
 - On-farm trials to evaluate the frequency of profitable returns at this application timing require flexible access to cooperative aerial applicators and, thus, are difficult to conduct.

v20101213 © 2010 Purdue Univ. 35

PURDUE
UNIVERSITY

Foliar fungicide trials




- Recent marketing targets earlier appl'n timings (V5 to V6, or about knee-high).
 - Claims of increased yield due to "plant health" benefits not related to disease pressure, but little independent data that corroborates.
 - Indiana corn growers would benefit from independent, on-farm trials that document the occurrence & frequency of yield responses.
 - Logistically challenging, but doable.

v20101213 © 2010 Purdue Univ. 36

PURDUE
UNIVERSITY

Seed nematicide trials




- New seed treatments are now available that promise improved corn yields due to protection from corn nematodes.
 - Little to no independent data available from field-scale comparisons of "normal" and nematicide seed treatments.
 - Simple enough OFR trials to conduct.... split-planter plot establishment..... coupled w/ soil sampling for nematodes.

v20101213 © 2010 Purdue Univ. 37

PURDUE
UNIVERSITY

Sharing OFR results...



- Purdue Extension is uniquely qualified to share the results from these independent OFR trials with farmers and consultants throughout the entire state.
 - Field days, winter programs, conferences
 - Web sites (e.g., Chat 'n Chew Café)
 - Diagnostic Training Center
 - Farm news media
 - Direct email


"Multiplier Effect"

v20101213 © 2010 Purdue Univ. 38

PURDUE
UNIVERSITY

Bottom line, on-farm research...

- Is good for growers
- Is doable and reliable
- Is good for you
- Is good for us
- Is fun & rewarding
- Try it..... you'll like it!




v20101213 © 2010 Purdue Univ. 39

PURDUE
UNIVERSITY

On-line hub for OFR research protocols and results...

PURDUE
Purdue Collaborative On-Farm Research



<http://www.agry.purdue.edu/ext/ofr>

v20101213 © 2010 Purdue Univ. 40
