ON-FARM RESEARCH NETWORK
MINNESOTA WHEAT

Putting Research to Work on the Farm

Update on the Network, 2016 Results, and 2017 Priority Areas

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Twitter

Pacific Northwest grain merchandiser:

Many pro's and con's for growing wheat

Whether wheat is your favorite crop or not we all strive to improve wheat production

What is the On-Farm Research Network?

- Wheat growers wanted more applied research
  - Resulted in full field length research trials
- Going onto our 6th growing season
- Funded by the Wheat Check-Off and currently with a grant from the Minnesota Department of Agriculture - AGRI Program

- Grower Driven, your input drives the direction

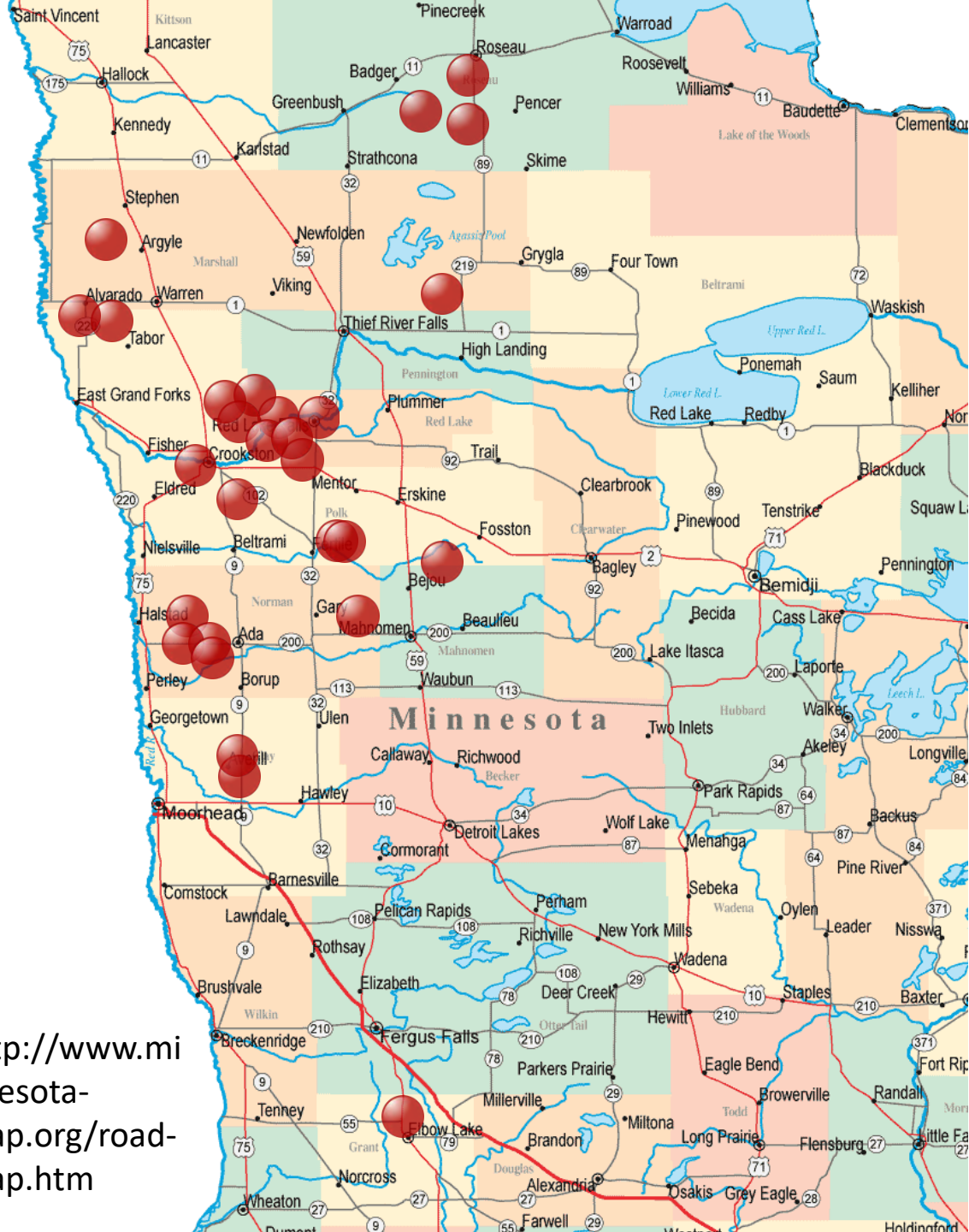
Research Principles

- Focused on refining small plot university research
- Farm-sized machinery, on full field variability
- Rigorous experimental design, randomization, and statistical analysis
- Trials conducted by a centralized research team
- Treatments comparing untreated check with a new treatment
- Between three and ten locations per trial per year, enough years to answer the questions

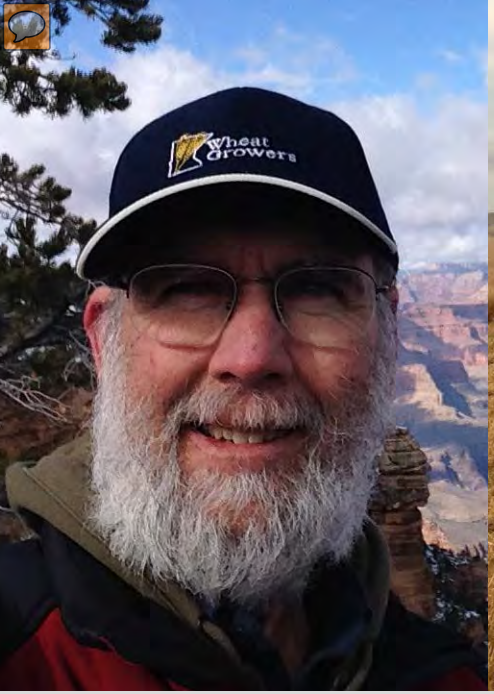
2016 was a good year for the OFRN

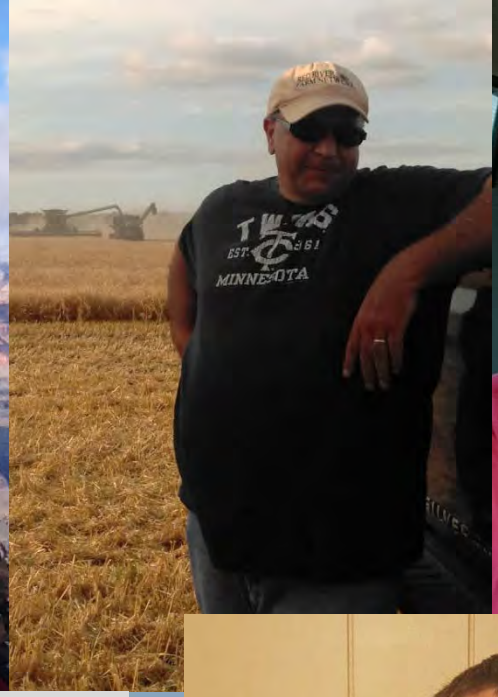
27 Trials in HRSW made it to harvest with **20** growers

11 topdress nitrogen
7 seeding rate
6 Palisade
2 ESN
1 N-serve



http://www.minnesota-map.org/road-map.htm





2016 Team

Topdressing with 28% UAN

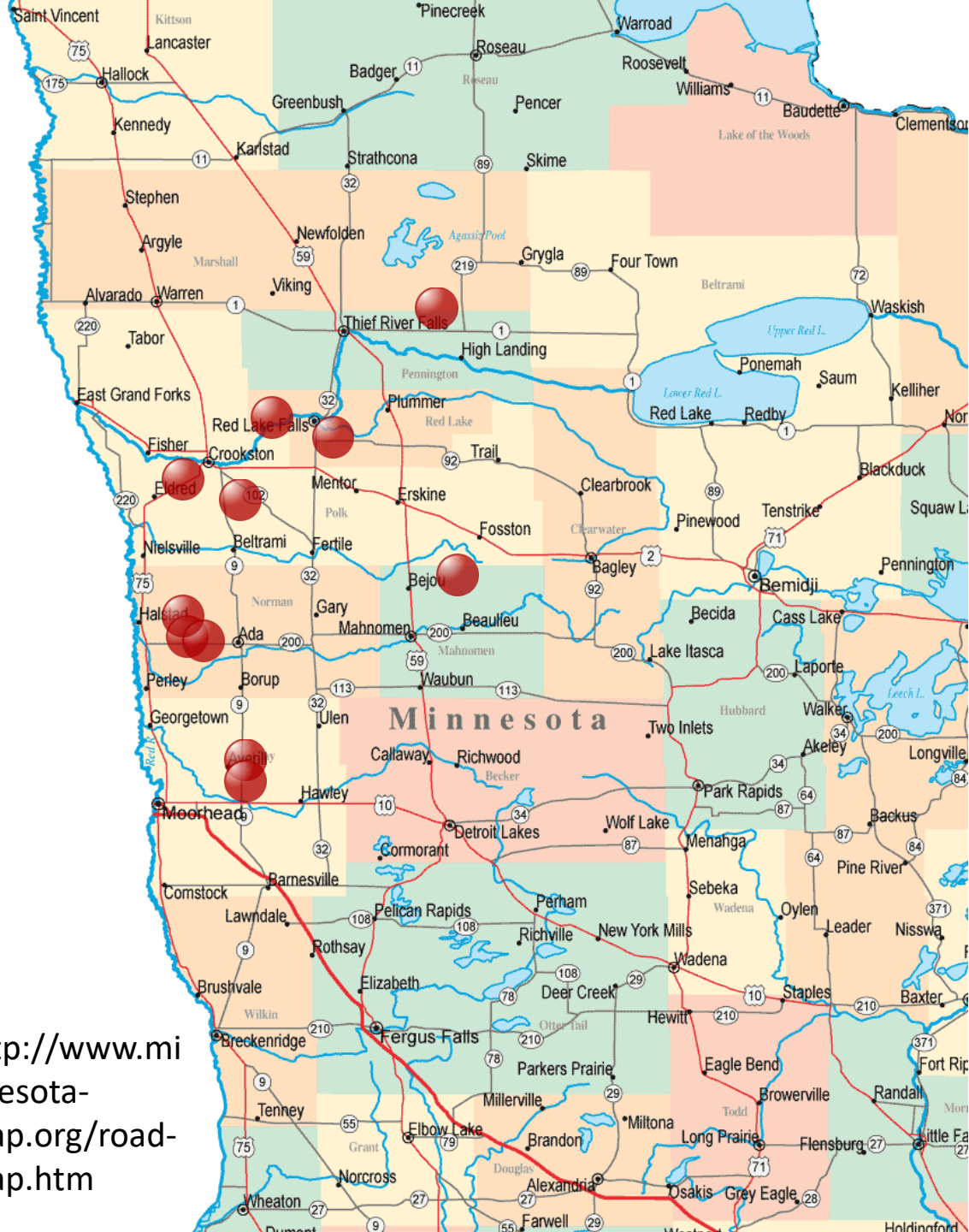
- This is something growers expressed interest in
- Wanted to try a timing to increase both yield and protein
- Dr. Joel Ransom, NDSU, found positive results with urea at this timing in 2015
- First year with this trial was 2016

Topdressing with 28% UAN

- 10 gallons 28% UAN + 10 gallons water with *Limus* nitrogen stabilizer- urease inhibitor at boot growth stage for 30 lbs/A nitrogen
- Growers applied their optimum N rate pre-plant
- TeeJet streaming nozzles to minimize leaf tissue burning
  - Also advised late evening application for less dew and wind
- Nozzles and *Limus* were generously donated

Varieties:

Linkert (7), SY Valda, Albany, Mayville and Prosper



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Results

- 6 locations had 0.3 to 0.6% increase in protein
- 5 locations had -0.1 to 0.1% slight change in protein
- No significant change in yield combined over all locations

$ Cost-Benefit Analysis

- 2016, Topdressing wheat near the boot stage did not pay

- 28% UAN was $15/A ($270/ton) in summer
- $7 custom application estimate
- Flattening wheat, more yield loss? 2 bu/ac?

- Protein discount about $0.08/fifth below 14%, very little premium, if any

Plant Growth Regulator - Palisade

- Lodged wheat is a detriment to production

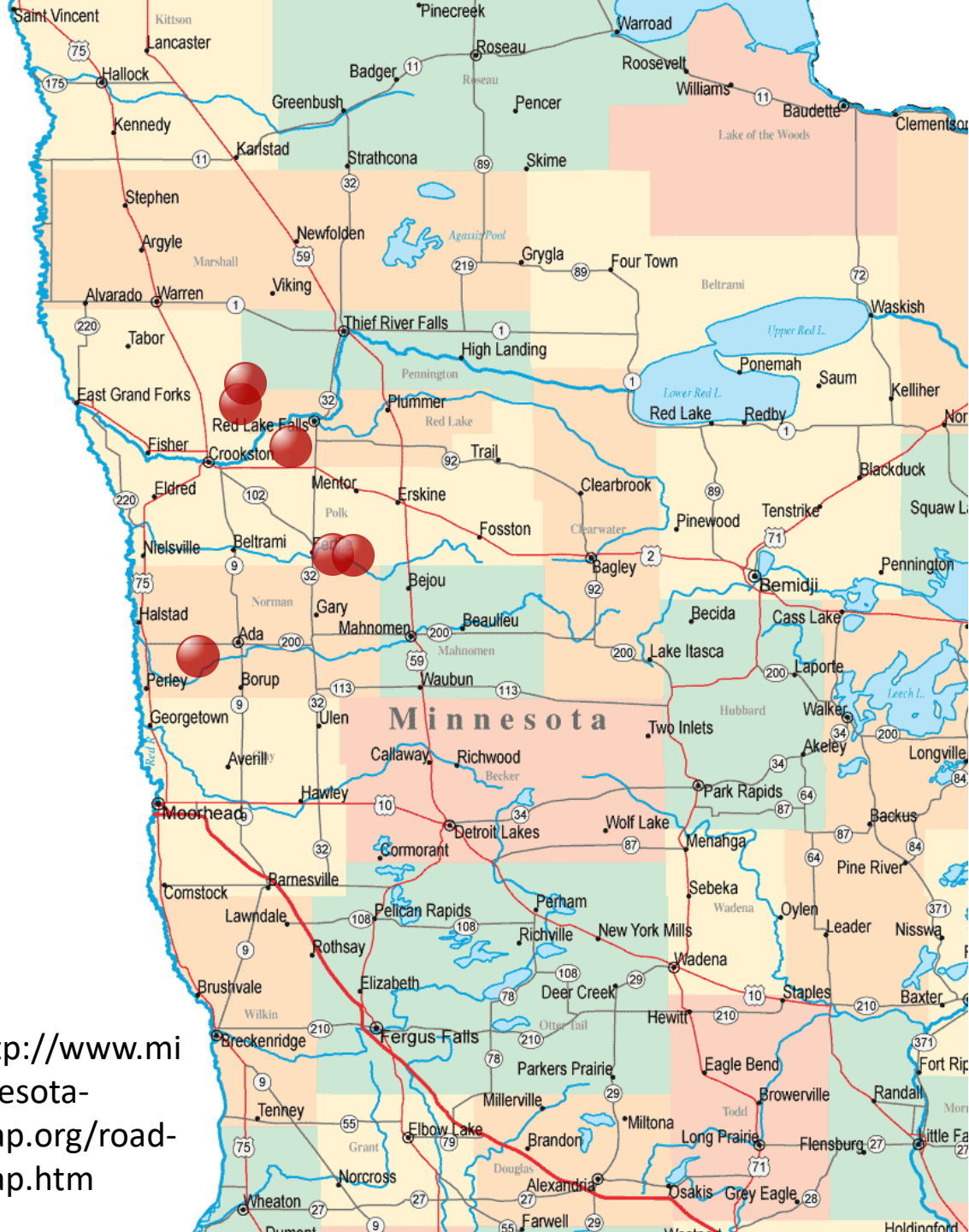
- We have two years of testing the PGR Palisade (Syngenta) for its ability to decrease lodging, increase yield, and increase combine efficiency at harvest

Plant Growth Regulator - Palisade

- 12oz/ac Palisade EC at Feekes 7, or 2 nodes present on main stem
- Varieties:
  - Prosper (X3), Forefront (X2) and Digger
- Data collected:
  - Population, plant height, lodging, test weight, protein and yield

6 locations:

Fertile (X2)
Hendrum
Dorothy
Red Lake Falls
St. Hilaire



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Results

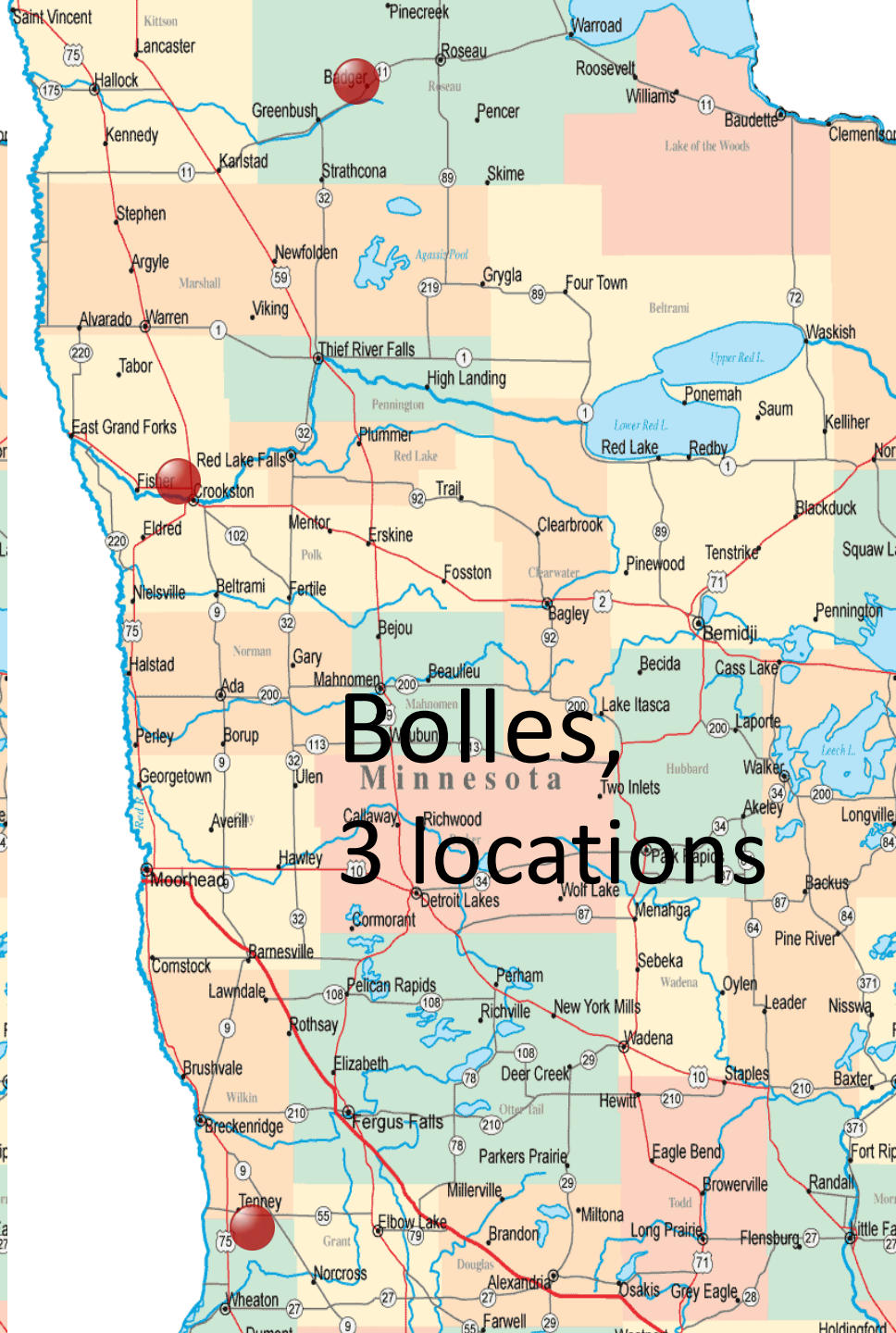
- Between 2.7 - 4.6 inches plant height reduced with Palisade
- Palisade increased test weight by an average of 0.7 lb/bu
- No protein difference
- Yield
  - One location had no difference
  - The rest were between 3.0 and 4.4 bu/ac greater with a Palisade application
- Lodging – difficult to measure in large plots

 Cost-Benefit Analysis

- Take out the location with no difference, there's an average of a 3 bushel increase
- $5 cash = $15
- Palisade is $12/ac
- Application cost $7/ac
- With application costs and tire track wheat, there was an economic loss
- With other benefits such as combine speed, growers can decide if the costs are justified, especially in a year with more lodging

Seeding Rate

- We receive many questions on what rate to seed new varieties
- Picked two recently released varieties and seeded them at 1, 1.5 and 2 million seeds per acre
  - Accounted for germination but not stand loss
- Data collected: population, tillers counts, head measurements, test weight, protein, and yield



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Several methods for calculating seeding rate

- Seeding rate may be way off with bushels/acre
- Better to consider:
  - Germination (%) – spring wheat typically high but can vary (certified seed vs. bin-run)
  - Kernel weight – seeds/lb or 1000 kernel weight
- Better yet:
  - Add in a stand loss component
  - 10-25%

Let's look at the math

	SY Soren	Linkert	HRS3530	
	-grams/500 kernels-			
Seeding Rate	13.9	16.3	19.8	
-----bu/ac-----	------million seeds/ac------			Difference
1.00	0.97	0.83	0.71	266,526
1.25	1.22	1.04	0.89	333,158
1.50	1.47	1.25	1.07	399,789
1.75	1.71	1.46	1.25	466,421
2.00	1.96	1.67	1.42	533,052
2.25	2.20	1.88	1.6	599,684
2.50	2.45	2.09	1.78	666,315

Results

- Stand loss from 14.7-24.9%
  - Increased as seeding rate increased
- Test weight, protein, and yield unaffected by treatment
- Bolles tillered below Linkert, but still around 1 tiller per plant

Economics, Bolles as an example

Seeding Rate	Seeding Rate[1]	Seed cost[2]	Yield	Gross Income[3]	Net Income
Seeds/ac	-Bushels/ac-	--$/acre--	-Bushels/ac-	----$/ac----	----$/ac----
1,000,000	1.5	18	65	325	307
1,500,000	2.2	26.4	64.2	321	294.6
2,000,000	2.9	34.8	64.1	320.5	285.7

[1] Estimated.

[2] Certified seed cost of $12.00 per bushel of HRSW.

[3] January wheat price of $5.00.

ESN and N-SERVE

Conclusion:

in the environments we tested it didn't pay

http://www.minnesota-map.org/road-map.htm

Take Home Messages

- Topdress N: We didn't lose enough preplant N in 2016 to make the additional N pay

- Palisade PGR: Yield was increased at all but one location and every location had a significant reduction in height

- Seeding rate: Stand loss averaged between 14.7 and 24.9% and seeding rate did not impact yield

2017 Research

- Topdress trial
  - Work towards a decision making tool growers can use that includes variables such as:
    - Soil type, variety, rainfall, fertilizer type and rate to help growers decided to make the application or not
- Sulfur response trial
  - 100 lbs per acre AMS vs no added Sulfur
  - Focusing on mostly coarse textured low organic matter soils

2017 Research

- Palisade PGR
- Seeding rate
- Variable rate N fertilizer vs flat N rate
  - Fertilizer maps will be made by Centrol Crop consultants
- Possibly a trial with CropScan 3000H
  - On-combine protein analyzer
  - Results are full field protein maps

Growers who participate

- Get reimbursed $1500/location
- Close to 24 hour/day service from OFRN team
- Find answers from research done in their own fields and in a complementary setting to small-plot research

Exciting news!

ON-FARM RESEARCH NETWORK

MINNESOTA

Minnesota Soybean Council is reviewing a proposal to form an Exploratory Group to learn more about the possibly of working with Minnesota Wheat to create their own On-Farm Research Network.

Minnesota Soybean?

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Thank you!

To YOU the wheat producers

OFRN Advisory Committee

Gary Purath

Proulx Brothers

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MINNESOTA DEPARTMENT OF AGRICULTURE

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