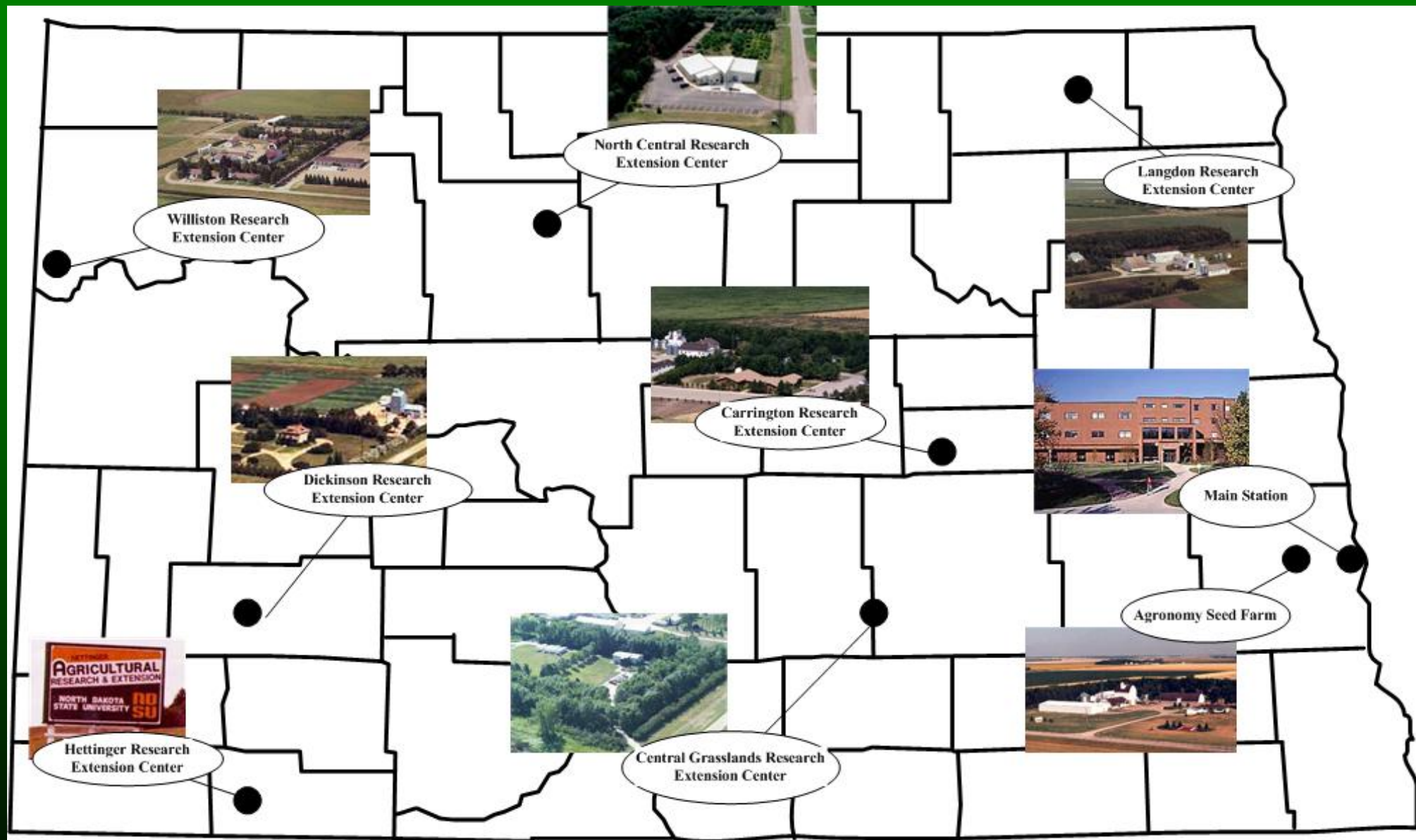


2006 Sclerotinia Initiative Annual Meeting
Minneapolis, MN
January 18-20, 2006

Carrington Research Extension Center
A Source for Sclerotinia Research

Blaine G. Schatz : Director/Agronomist
&
Dr. Bob Henson, Research Agronomist

NDSU Research & Extension Centers



NDSU

CREC Agronomy Research

Relative to North Dakota 2005 Reported Acreage

Source: Farm Service Agency

• Spring Wheat	6,678,000	• Oats	439,000
• Grasses (all)	3,423,000	• Winter Wheat	301,000
• CRP	3,342,000	• Sugar Beets	251,000
• Soybean	2,900,000	• Lentil	147,000
• Forages	2,049,000	• Potato	91,000
• Durum	1,941,000	• Navy Bean	88,000
• Corn	1,400,000	• Proso Millet	41,000
• Barley	1,118,000	• Safflower	31,000
• Sunflower	1,111,000	• Mustard	24,400
• Canola	1,026,000	• Black Bean	21,000
• Fallow	916,000	• Other DEB	20,300
• Flax	878,000	• Rye	18,200
• Alfalfa	587,000	• Buckwheat	12,900
• Field Pea	541,000	• Pink Bean	11,600
• Pinto Bean	469,000		

NDSU

Sclerotinia Initiative : Crops of Focus

Crop	Importance in North Dakota
Sunflower	# 1 state in nation
Dry Edible Beans	# 1 state in nation
Canola	# 1 state in nation
Field pea, lentil, & chickpea (Cool-season Pulses)	# 1 state in nation
Soybean	# 10 state in nation

Carrington Research Extension Center

Diversity among Research and Extension Programs



CREC : Diversity of Crop Field Trials in 2005

Cereal Grains	Oilseeds	Legumes	Misc. Broadleaf	Misc. Grass	New & Emerging	High Value
Spring Wheat (42)	Sunflower (15)	Soybean (25)	Lupin (4)	Forage (7)	Cuphea (3)	Potato (2)
Corn (12)	Canola (15)	Field Pea (26)	Forage (2)	Triticale (3)	Camelina (1)	Onion (8)
Barley (15)	Flax (4)	Dry Bean (16)	Buckwheat (1)	Rye (1)	Niger (2)	Carrot (4)
Durum (8)	Mustard (2)	Chickpea (5)	Borage (1)	Proso Millet (1)		Cabbage (3)
Oat (8)	Crambe (1)	Lentil (4)		Spelt (1)		Sweet Corn (4) Pumpkin (2)
** number	in (#) equal	number of	studies.			Peppers (1) Broccoli (1)
85	37	76	8	13	6	NDSU 25

CREC : Plant Disease Research Effort is a Significant Part of Agronomy Research Program



- Environment of region inherently favors expression of plant diseases
 - > 30 field trials specific to plant diseases
 - ~ 30 trials of crop germplasm where disease reactions are recorded
- Inherent disease results in significant collaborations with other plant disease researchers



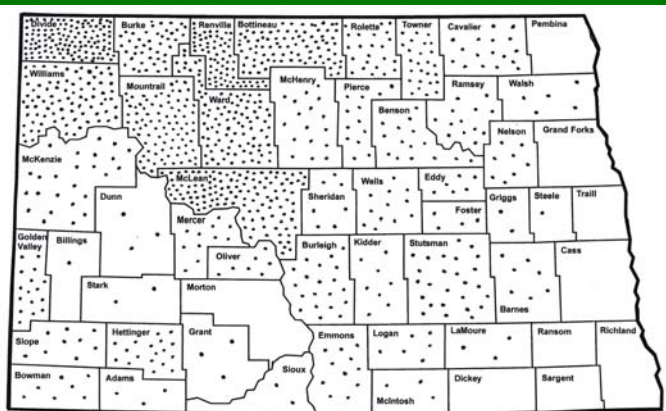
- Plant disease studies
- Variety/Hybrid evaluations
- Tillage & Cropping Systems trials
- Fertility & Plant Nutrition
- Weed Control/Management
- Cultural Practices (~density, planting dates)



NDSU Carrington Research Extension Center

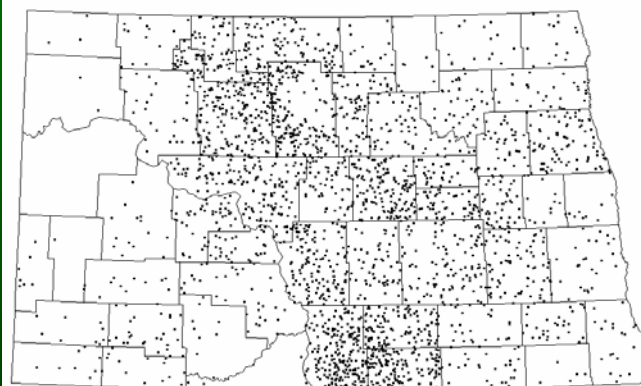
Uniquely Located to Evaluate Crops of Sclerotinia Initiative

Field Pea : Acreage, North Dakota 2005



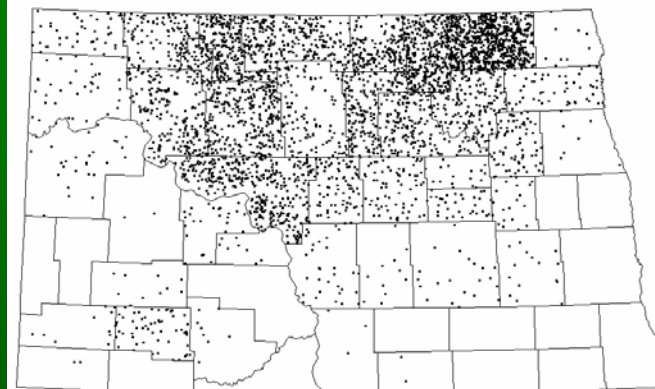
1 Dot = 500 Acres

**All Sunflower: Production
North Dakota, 2004**



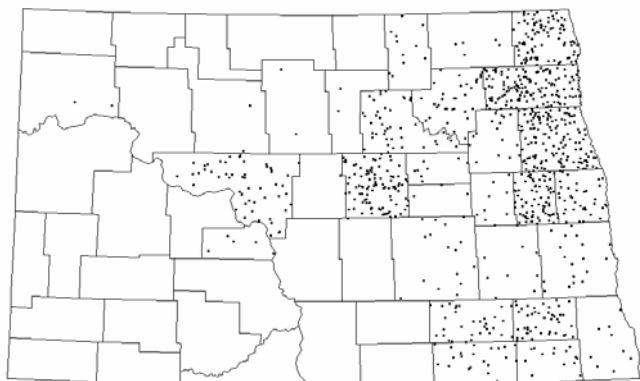
1 Dot = 300,000 Lbs

**Canola: Production
North Dakota, 2004**



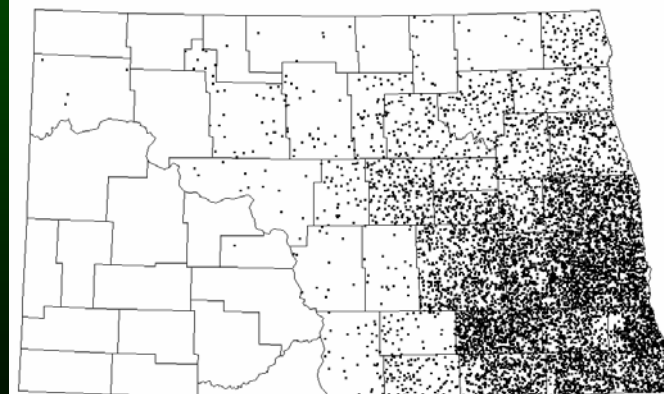
1 Dot = 300,000 Lbs

**Dry Edible Beans: Production
North Dakota, 2004**



1 Dot = 5,000 Cwt

**Soybeans: Production
North Dakota, 2004**



1 Dot = 10,000 Bushels

The CREC is in a Region That Historically and Inherently has Experienced Sclerotinia (White Mold)

- Dr. Jim Venette : dry bean fungicide trials, early 1980's
- Dr. Berlin Nelson : sunflower mid-stalk & sclerotia trials mid 1980's
- Schatz : sclerotinia susceptibility of 16 broadleaf crops, 1990-92



CREC : Climatic Conditions Favor Sclerotinia Infections

- **Growing season duration:** ~ mid-April to late September
 - May 18 last spring frost
 - September 21 first fall frost
 - 126 frost free days
- **Temperature regime**
 - April 40, May 53, June 63, July 69, August 66, September 55
- **Growing season precipitation**
 - 13.8 inches rainfall during growing season
 - June = 3.5”, July = 2.8”, August = 2.0”
 - 17.5 annual precipitation
- **Heimdal silt loam soil**

CREC : Water to Enhance Plant Disease Research



- Irrigation was the base to establishment of the CREC
- Water delivery options to facilitate plant based research
- Infrastructure
 - 5 irrigation wells
 - 4 center pivots
 - Flood irrigation area
 - Misting system infrastructure



Carrington Research Extension Center has Identified Sclerotinia as a Department Research Priority

Crops

- **Sunflower - 2000**
- **Canola – 2001**
- **Dry Edible Bean - 2002**
- **Field Pea - 2003**
- **Soybean – 2006**

Initial Efforts

- **Develop misting systems specific for each crop**
- **Develop methodologies for disease inoculation and misting system operation**
- **Foster collaborations with key researchers at USDA and area Universities**



CREC : Fields Dedicated to Misted Sclerotinia Trials



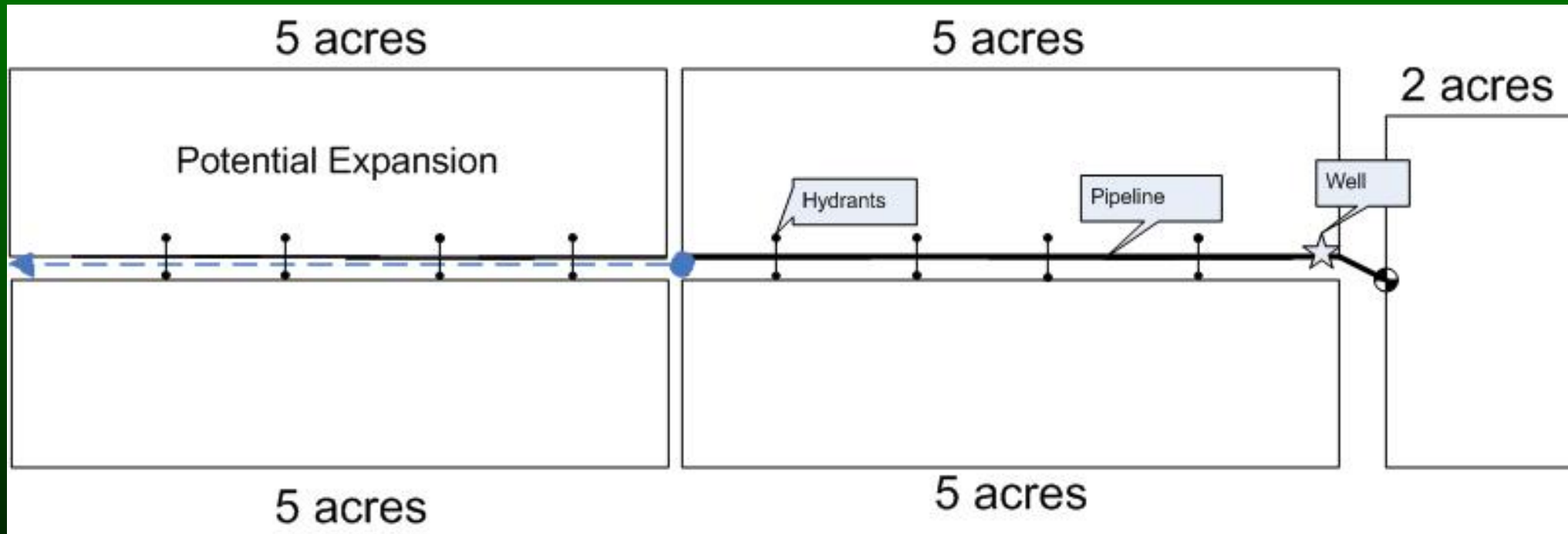
CREC : Fields Dedicated to Misted Sclerotinia Trials



CREC : Prepared to Dedicate an Additional 10 Acres to Sclerotinia Misting Systems



NDSU Carrington Research Extension Center Disease Misting System Infra-structure



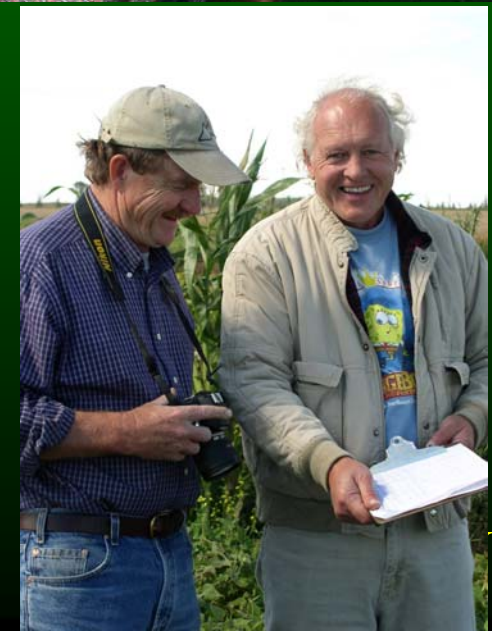
Collaborators Working with CREC Staff on Sclerotinia Research in 2005

- **USDA-ARS, Fargo ND**
 - Dr. Gulya, Dr. Miller, Dr. Seiler, etc
- **NDSU: Fargo, Langdon**
 - Dr. Bradley, Dr. Rasmussen, Dr. Grafton, Dr. del Rio, Mr. Halley
- **USDA-ARS, Pullman WA**
 - Dr. Chen, Dr. McPhee, Dr. Muehlbauer
- **South Dakota State University**
 - Dr. Draper
- **University of Minnesota**
 - Dr. Porter, Mr. LeGare



Collaborators Working with CREC Staff on Sclerotinia Research in 2005

- **University of Idaho**
 - Dr. Singh
- **Colorado State University**
 - Dr. Brick
- **Agriculture and Agrifoods-Canada**
 - Dr. Rashid
- **National White Mold Nursery**
 - Dr. Steadman
- **Private Industry – Numerous**
 - Commodity Groups, Seed, Chemical, & Bio-Agents



CREC Field Research Methods and Approaches to Investigate Sclerotinia

- **Methodology to Induce Desired Infections**
- **Germplasm Improvement: Genetic Resistance/Tolerance**
- **Disease Control: Fungicides & Biological Control Agents**
- **Cultural Practices (Tillage, plant density, rotation, etc.)**

CREC : Sunflower Sclerotinia Research

- Head Rot Germplasm Evaluation
- Commercial & Experimental Hybrid Screening
- Stalk Rot Germplasm Evaluation
- Head Rot Fungicide Evaluation
- Biological Control



CREC : Field Pea Sclerotinia Research

- Fungicide Evaluation
- Germplasm Evaluation



CREC : Canola Sclerotinia Research

- Fungicide Evaluation
- Germplasm Evaluation



CREC : Dry Bean Sclerotinia Research

- Germplasm Evaluation.



CREC : Soybean Sclerotinia Research

- Fungicide Evaluation
- Correlate Infection Levels to Yield Loss



Carrington Research Extension Center

Sclerotinia Research : Summary

- **The long-term objectives of the Sclerotinia program in Carrington are to generate reliable, reproducible data on the viable methods for managing Sclerotinia in diverse crops and to disseminate this information to the appropriate user groups.**
- **Favorable environment, experienced staff, misting infrastructure, excellent collaborators.**



