



# BIOMASS PRODUCTION RESEARCH

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# Capabilities

- Analytical capabilities
  - Elementar Macro, Max, NIR, fiber analysis, bomb calorimeter, general lab equipment
- Land/equipment
  - 6700 acres including wheat, native range, improved pasture, dedicated small plot areas, riparian, wildlife
- Greenhouse
  - New facility - 2007

# Biomass Production

- **Environmentally responsible**
  - **Compatible with existing objectives**
- **Agronomically feasible**
  - **Realistic?**
- **Economically viable**
  - **Producers must make a profit**

# Targeted market?

- **Direct burning**
  - BTUs, ash, moisture, sulfur ?
- **Gasification**
- **Cellulosic fermentation**
  - Soluble sugars, fiber, lignin, ash?

# Objectives

1. ***selection and evaluation*** of productive, well-adapted bioenergy crops and forages.
2. development of efficient production systems for bioenergy crops, which ***include legumes to provide nitrogen*** inputs.

# Objectives

3. **integration of biomass/bioenergy crops**, conventional crops, forages and livestock into diversified, sustainable enterprises
4. understanding and mitigating the **environmental impacts of biomass** harvest from CRP land, riparian buffer strips, and other conservation practices

# FRSS2004

## Forage sorghum & sorghum/sudan hybrids

- 26 entries
- Height, stem diameter, stem density, maturity
- Two harvest strategies
  - Once (late September)
  - Once plus ratoon (Aug/post frost)



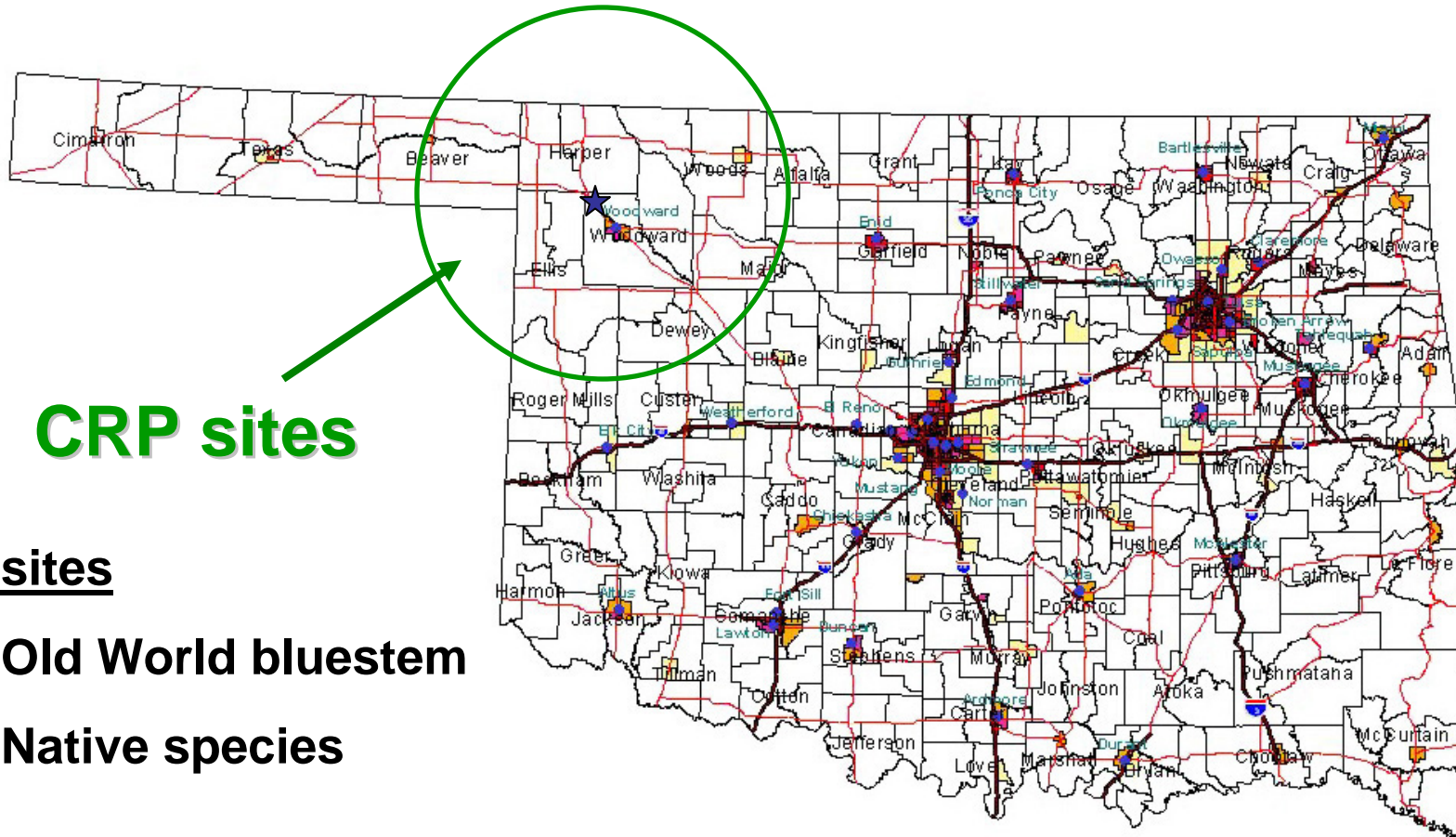
Completed 2006 – 3 years data

# FRSS2004

- **DM yield (tons/ acre) – 2004/2005**
  - 2 cut – 8.8 (Piper) to 14.6 (2-way F-145 (HFS))  
**Mean = 11.7**
  - 1 cut – 7.3 (Piper) to 21 (Tentaka (HFS))  
**Mean = 12.8**
  - Yr x Entry – ns; Trt by Entry - <0.0001



# FRCRP2004



**CRP sites**

**6 sites**

**3 Old World bluestem**

**3 Native species**

**Complete December 2006 – 3 years data**

# Owens CRP site – July 2005

## 3 harvest dates

July – October - December



**Old World bluestem**

## **Native**

**Collecting species  
composition data**

**Little blue, side oats, sand  
love, big blue, Indian, switch  
& bundleflower**

# FRCRP2004

2004 and 2005

<b>Location</b>	<b>OWB</b>	<b>Native</b>
	DM lbs/acre	
Owens	5290	2930
McElhiney	3730	1930
Adams	3230	1270
<b>Mean</b>	<b><u>4080</u></b>	<b><u>2040</u></b>
LSD	1060	360

# FRBMN2005



**Switchgrass**

**Gamagrass**

**Miscanthus**

**Sorghum/Sudan**

0, 100, and 200 N, legume fall overseed

**In progress**

# FRBMGRZ2004

- Graze early-season
- Rest summer
- Biomass late-season



**Gama / Johnson mix?**

**Grazing will be initiated May 2007**

# FRRIP2005

Biomass production  
from riparian areas



**Still working on  
establishment**

# Legume research

- **Alfalfa**
  - Persistence
  - Population development
  - Remote sensing



# Legume research

## *Trifolium*

- PI evaluations
- Red clover
- White clover





# Legume research

**Bundleflower sib rows**



**Bundleflower and  
switchgrass  
study**

**To be initiated in  
2007**