

Cropping Systems Research for Biomass Energy Production



Investigators:

| | |
|-------------|----------------|
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Cropping Systems Research for Biomass Energy Production

Rationale

- Production of switchgrass for biomass will be marginally economical under projected yield and price estimates.
- Income from switchgrass production might be increased if complementary uses can be developed.
- Using the switchgrass crop for both forage and biomass production may increase the return per land unit.

Cropping Systems Research for Biomass Energy Production



Overall Objective

Develop management systems for producing switchgrass as both a biomass and forage crop.

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Specific Objectives

- Determine the effect of timing of spring grazing on subsequent production of switchgrass biomass for fuel.
- Determine the effect of timing of haying on subsequent production of switchgrass biomass for fuel.
- Determine the effects of interseeding perennial legumes into switchgrass on yield and quality of first-cutting hay and subsequent yield and burn characteristics of biomass.
- Assess the potential of intercropping small grains with switchgrass grown for biomass.
- Evaluate establishment technologies for switchgrass using corn or forage sorghum as companion crops.

Grazing Effects on Biomass Yield



Treatments:

Control
Grazing - V2
Grazing - E2

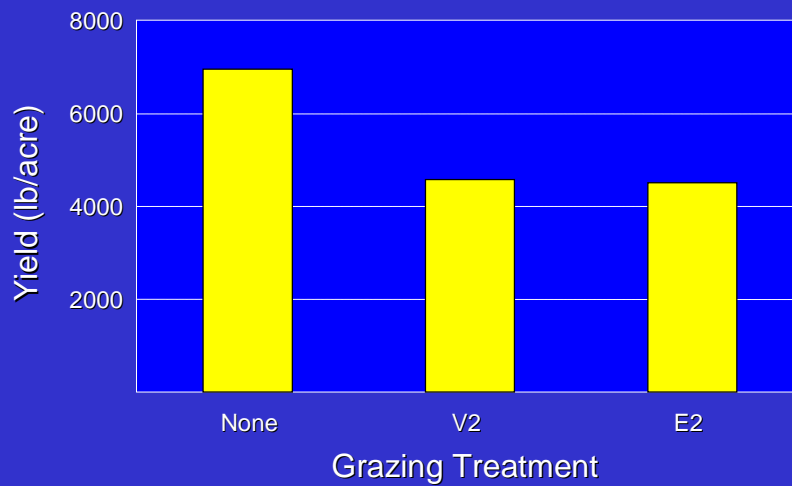
Locations:

Sellers Farm
Eddy Farm

Design:

RCBD
4 reps

Grazing Effects on Biomass Yield



Haying Effects on Biomass Yield



Treatments:

Control
Haying - V3
Haying - R0

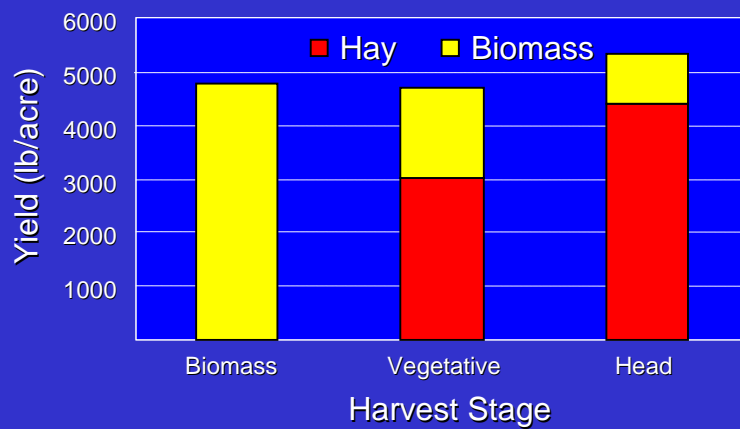
Locations:

Sellers Farm
Eddy Farm

Design:

RCBD
4 reps

Spring Haying Effects on Biomass Yield



Interseeding Legumes into Switchgrass



Treatments:

Control
Alfalfa
Birdsfoot trefoil
Red clover
Sweetclover

Locations:

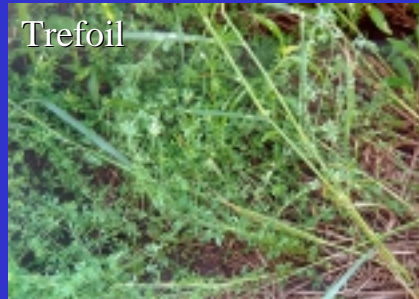
Lodge Land
Osenbaugh Farm

Design:

RCBD / 4 reps

Interseeding Legumes into Switchgrass





Establishing Switchgrass with Cover Crops



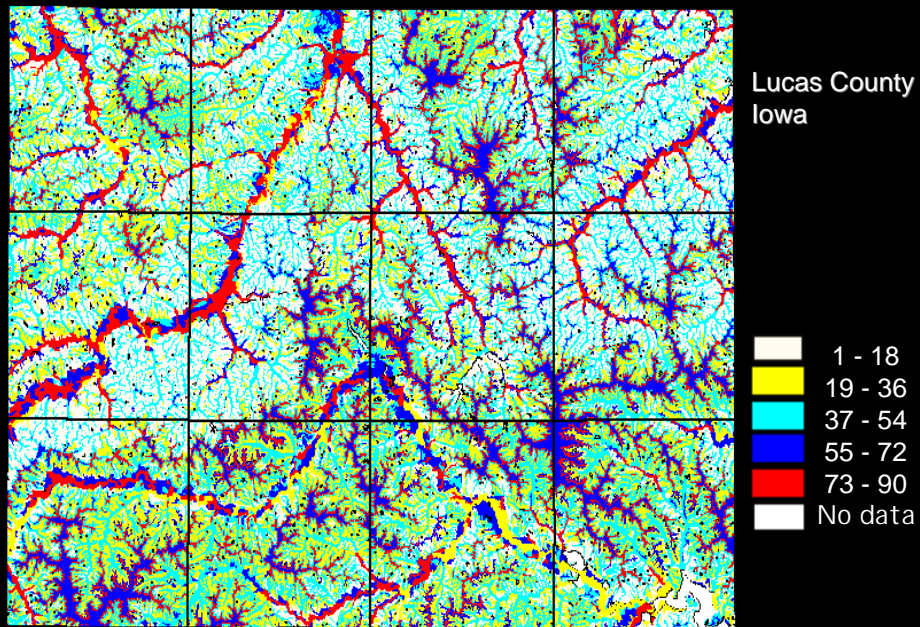
| Treatment | | 1995 | 1996 |
|------------------|--------------|------------------------|------|
| | | Plants m ⁻² | |
| Corn w/ atrazine | | 26.3 | 46.4 |
| Hybrid | CRM 108d | 24.8 | 45.2 |
| | CRM 113d | 28.0 | 47.4 |
| Populat. | Low | 28.0 | 47.4 |
| | Medium | 27.0 | 50.6 |
| | High | 23.7 | 50.4 |
| Spacing | 76 cm | 23.7 | 45.2 |
| | 114 cm | 29.1 | 47.4 |
| Harvest | Early silage | 23.7 | 48.4 |
| | Late silage | 23.7 | 43.1 |
| | Grain | 28.0 | 48.4 |
| Controls | Atrazine | 21.5 | 53.8 |
| | No atrazine | 14.0 | 45.2 |



Site-Specific Management of Switchgrass for Biomass Production



Corn Suitability Rating



Site-Specific Management of Switchgrass for Biomass Production

Objectives:

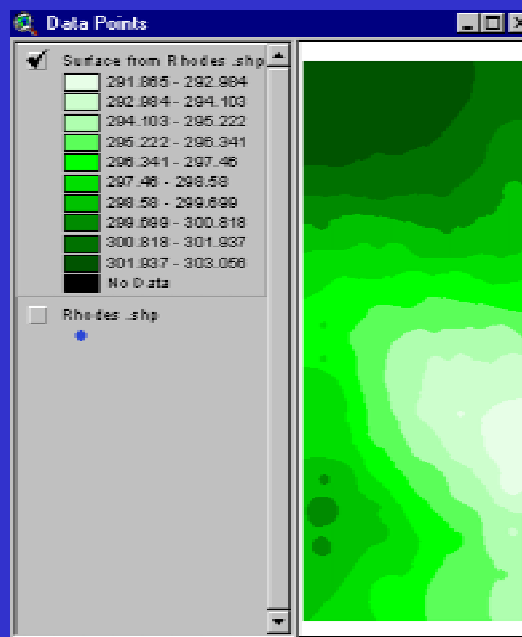
Develop models for characterizing
potential productivity of switchgrass
using:

- Digital elevation mapping
- Soil electrical conductivity mapping
(electromagnetic induction)
- Multispectral radiometry (vis/nir)
- Yield monitoring

Site-Specific Management of Switchgrass for Biomass Production



Digital Terrain Mapping



Site-Specific Management of Switchgrass for Biomass Production

Outcomes:

- Rapid, low-cost method for predicting biomass productivity.
 - Contracting purposes
 - Inventory control
- Development of site-specific management practices.

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- Development of site-specific management practices.

