What we know about Cover Crops for Late-season Grazing – 5 Year Summary

Kevin K. Sedivec
Extension Rangeland Specialist
School of Natural Resource Sciences
North Dakota State University

March 28, 2012

Dual Cropping Study at the Central Grasslands Research Center in 2007 - 2011

Kevin Sedivec, Bryan Neville, Andrew Fraase, Dennis Whitted, Greg Lardy, Laura Overstreet, and Paul Nyren

School of Natural Resource Sciences, Animal Sciences Department, Central Grassland Research Extension Center

Our Questions

- Can we use cover crops for late-season grazing?
  - YES
- Are they cost effective?
  - Depends
- Do they create any Soil Health Benefits when Grazed?
  - Unknown to date
- What plant species should you use?

THE OVERALL QUESTION!
Can We Provide a Cost-effective Alternative?

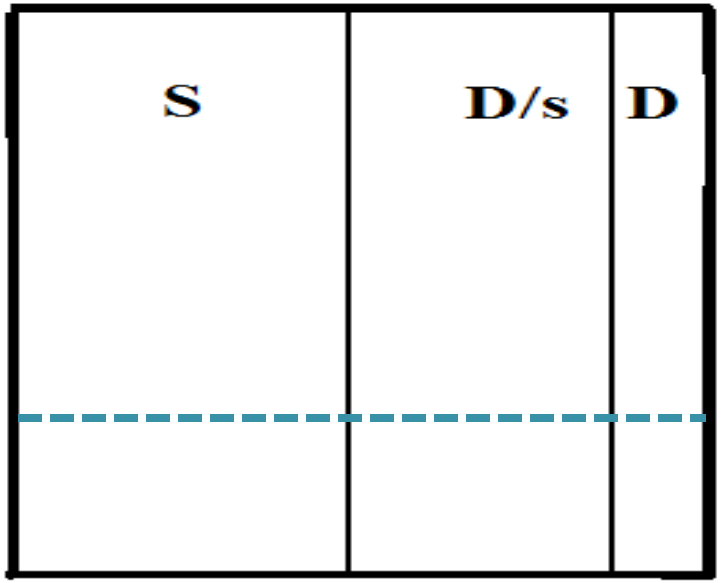
- Native Range: $1.02 hd/d *(5-yr average)*
- Drylot: $1.52 hd/d *(NASS 2011)*

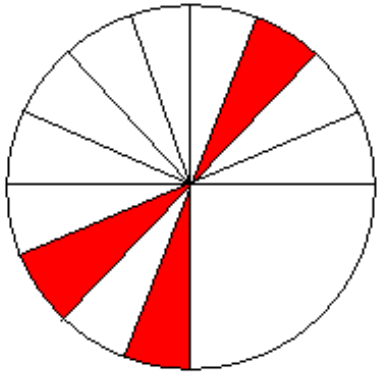
Objective

- Determine differences in forage production among cover crop alternatives
  - Increases Carrying Capacity and Stocking Rate
- Determine differences in cow performance
- Determine differences in soil health characteristics

Study Area

- 5 year of a 10 year project
- Nine – 10 acre pastures
- Moveable Cross-fence divided the nine pastures
  - Increasing grazing efficiency
- Three – 40 acre native range pastures



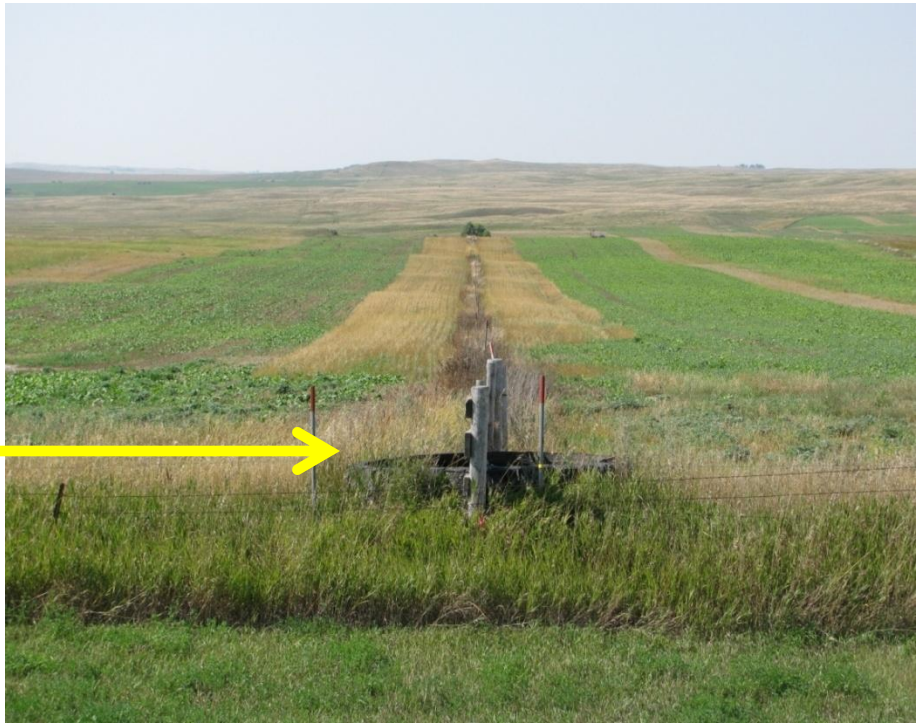


Study Design

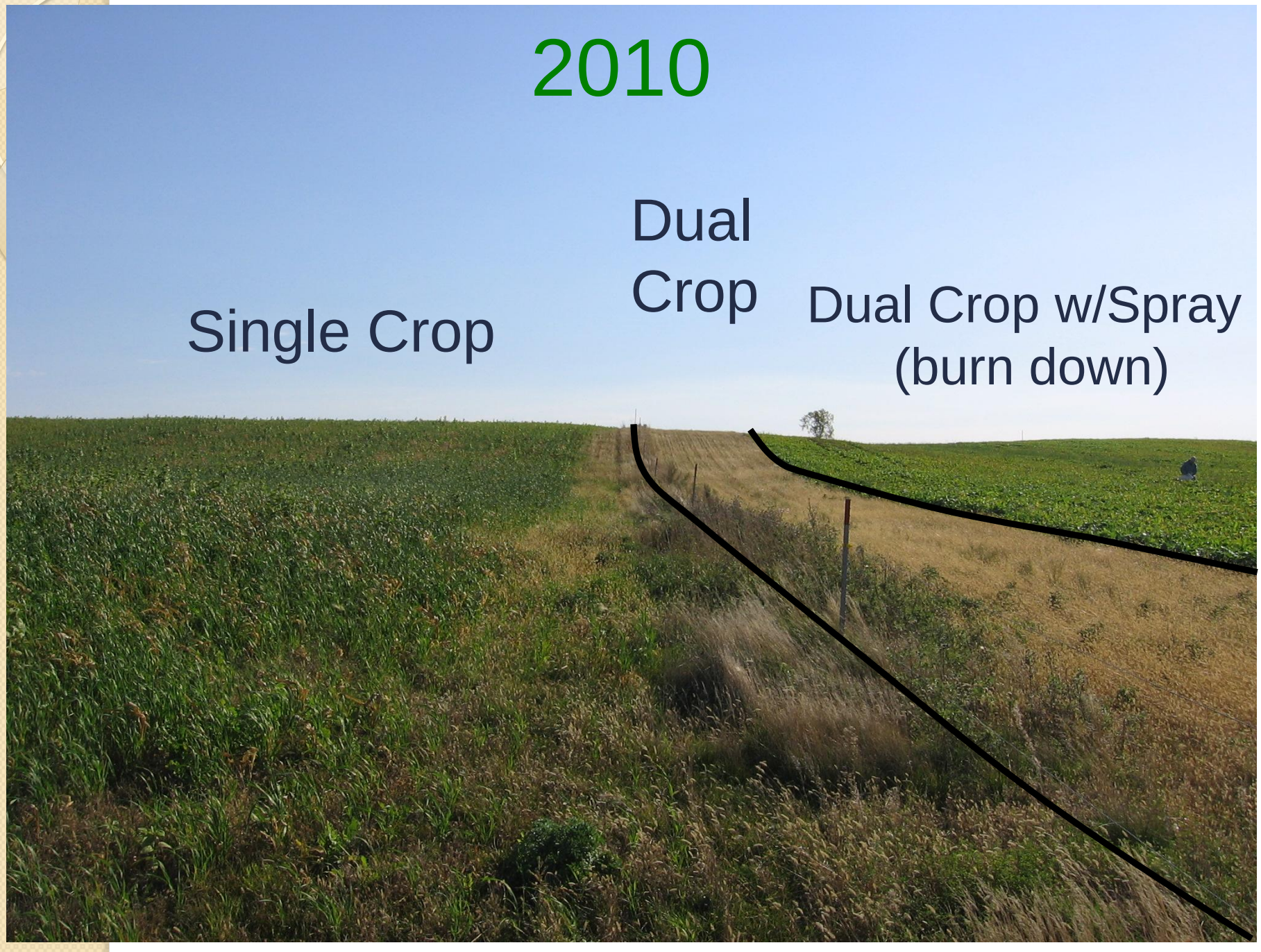
- 3 different annual forage treatments
- Split – single/dual crop
- Response variable – spray
  - (1 qt Glyphosate/ac

following hay harvest and prior to cover plant seeding)

- Water: hauled or well
- Windbreak provided



2010

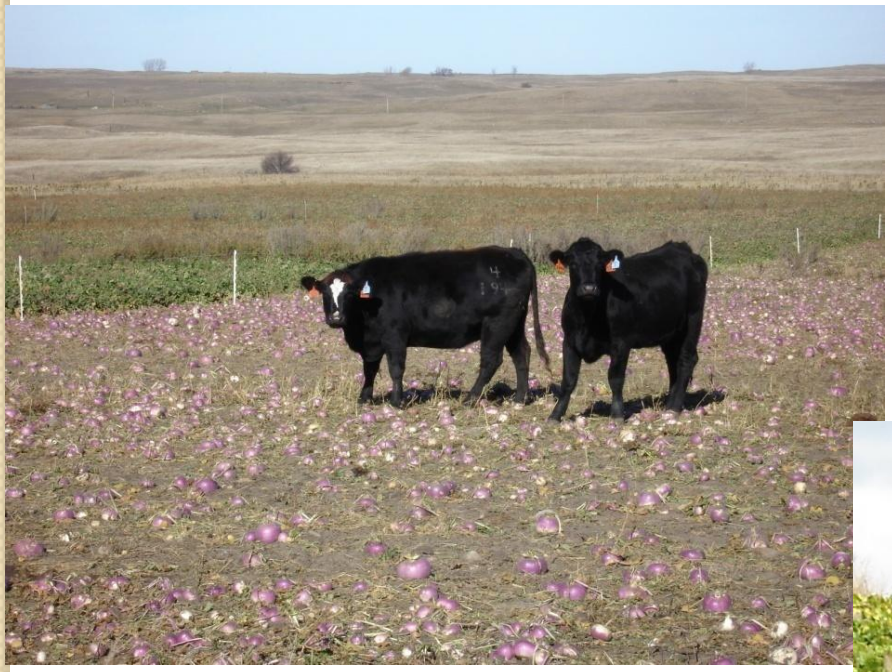


Treatments

- **Turnip**
  - Purpletop and Pasja
  - 3.25 lb/a
- **Foxtail Millet**
  - Golden German
  - 20 lb/a
- **Cocktail Mix**
  - 6 complementing species
  - ~ 32 lb/a
- **Native Range**
  - Control
  - Bluegrass, Needlegrass, Wheatgrass, Grama grass

Seeded mid July to early August

Grazed Turnips



Purpletop

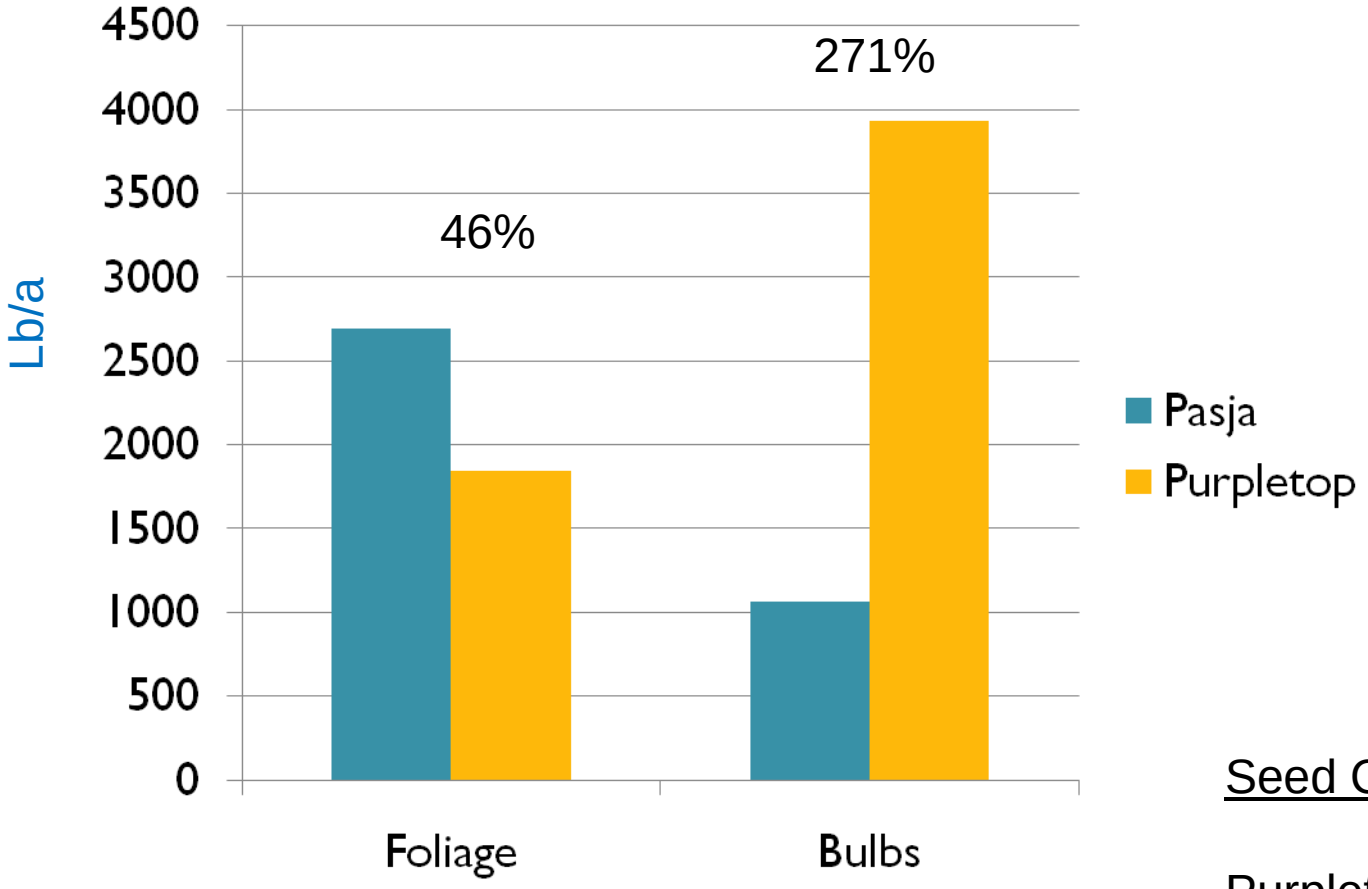
2007 and 2009

Pasja

2008, 2009 and 2010

Turnips

Purpletop versus Pasja in 2009



Seed Costs/ac:

Purpletop - $5.54
Pasja - $6.75

Purpletop versus Pasja

- Pasja produced 900 lb/acre more above ground grazable forage then Purpletop
- Pasja cost $1.21/ac more

- Cost $0.0013/lb more using Pasja, or $2.69/ton

Seeding Turnips

- DO NOT over seed turnips, or any brassica
  - More IS NOT better!
- Preferably seeded in a cocktail mixture
  - 0.5 to 1 lb/ac

Cocktail Mix

- 2007
  - Turnip (purple top)
  - Radish (forage)
  - Sunflower (oil seed)
  - Soybean (conventional)
  - Cowpea (red ripper)
  - Foxtail Millet (German)
- 2008
  - Turnip (pasja)
  - Radish (forage)
  - Sunflower (oil seed)
  - Red Clover (Mammoth)
  - Sorghum-sudan (BMR)
  - Triticale (spring)

Cocktail Mix

- 2009
  - Turnip (pasja)
  - Radish (forage)
  - Sunflower (oil seed)
  - Sorghum-Sudan (BMR)
  - Hairy vetch
  - Forage barley (Haybet)
- 2010
  - Turnip (pasja)
  - Radish (forage)
  - Sunflower (bird seed)
  - Sorghum-Sudan (BMR)
  - Forage soybean
  - Forage oat (Jerry)
- 2011
  - Field pea

Legumes?

- Cow Peas
- Field Pea
- Hairy Vetch
- Lentils
- Soybean
- Forage Soybean
- Red Clover
- Sweetclover

Legumes – Cost/ac to Seed

- Cow Peas $27.20
- Field Pea 16.20
- Hairy Vetch 32.00
- Lentils 19.20
- Soybean $9.00
- Forage Soybean 65.00
- Red Clover 16.00
- Sweetclover 20.00

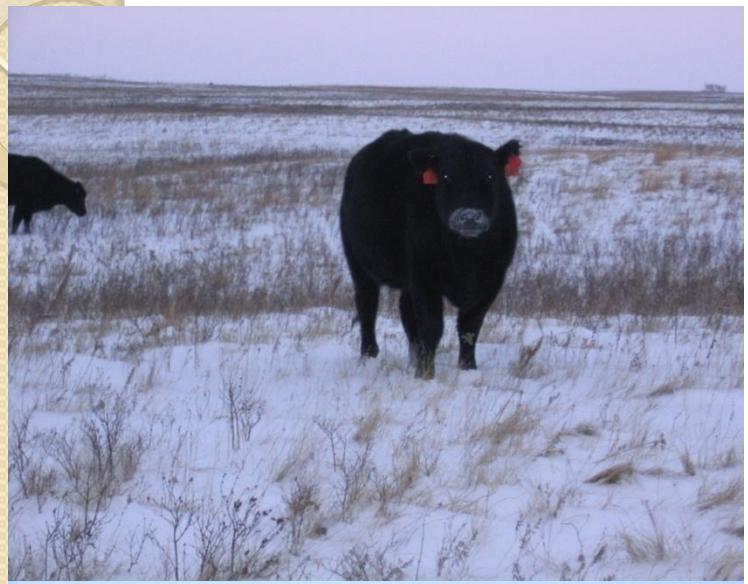
Legumes – Cost/ac to Seed

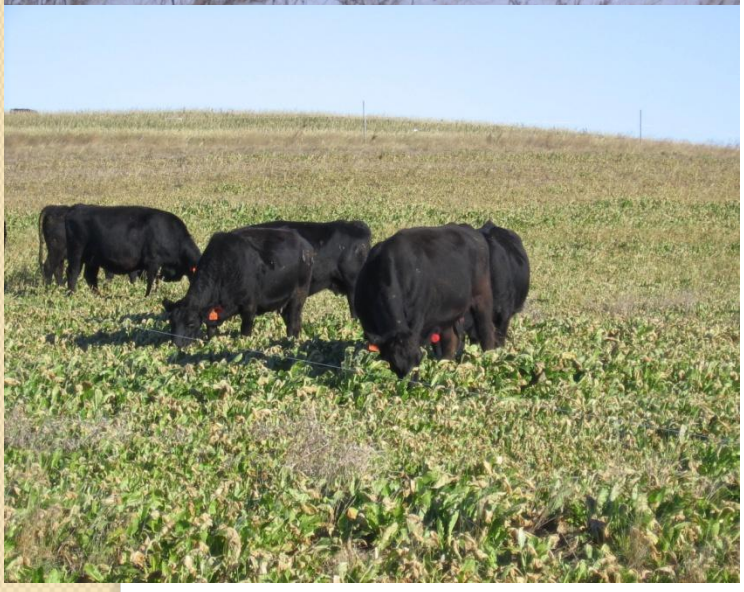
- Cow Peas $27.20✓
- Field Pea 16.20✓
- Hairy Vetch 32.00✓
- Lentils 19.20
- Soybean $9.00 ✓
- Forage Soybean 65.00 ✓
- Red Clover 16.00 ✓
- Sweetclover 20.00

Plant the Legume that fits your Situation

- Cool-season
  - Field Pea
  - Lentils
  - Red Clover
- Winter Annual
  - Cow Peas
  - Hairy Vetch
- Warm-season
  - Soybean
  - Forage Soybean
- DO NOT seed warm-season or winter annual legumes after mid-July in a Cocktail Mixture!
  - THEY are NOT COST EFFECTIVE!

Cow Grazing

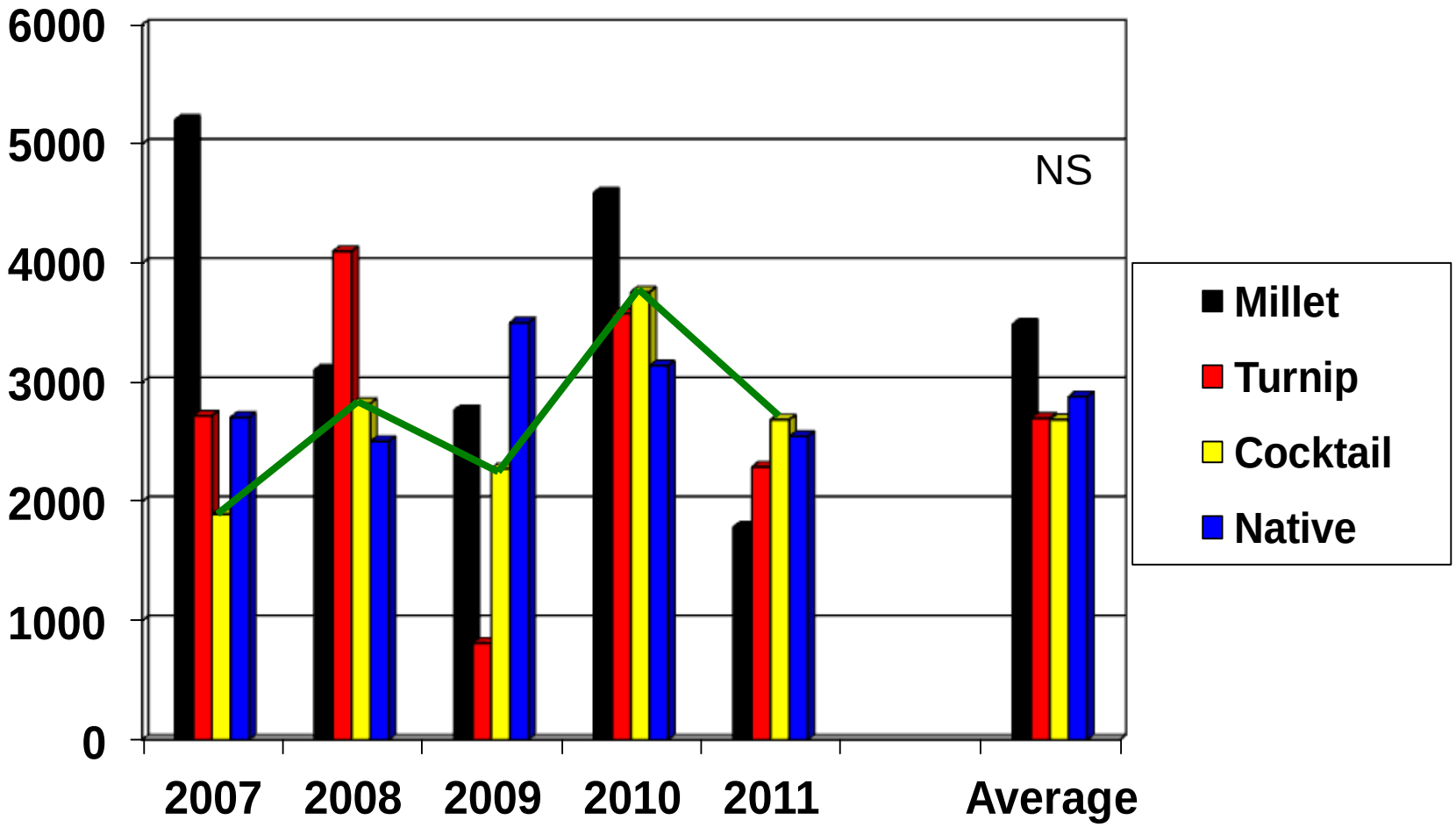




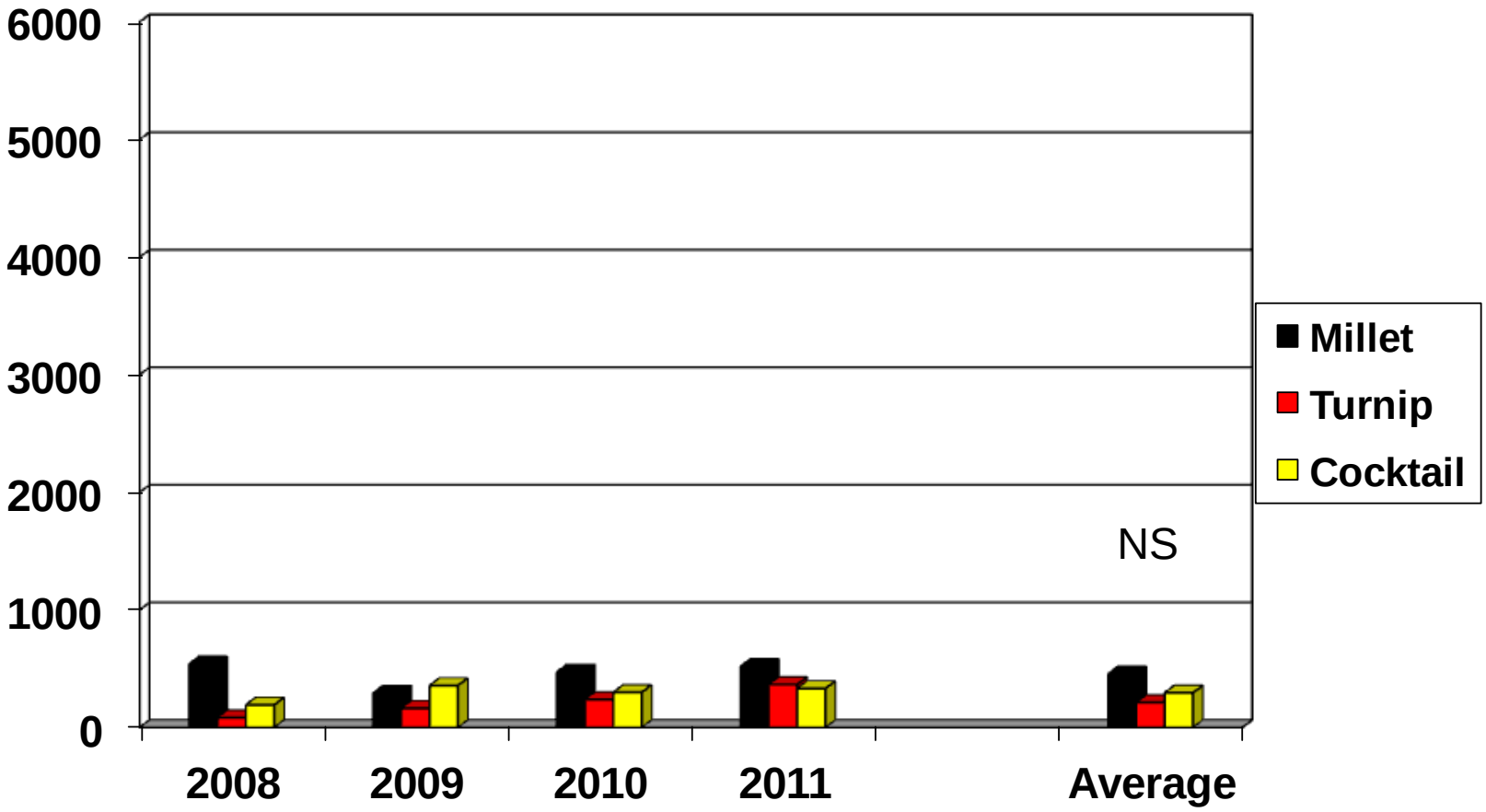
- Simmental – Angus cross
  - non-lactating, second trimester
- Planned Grazing – 60 d
  - 2007 – 42 days (159 hd)
  - 2008 – 42 days (114 hd)
  - 2009 – 48 days (81 hd)
  - 2010 – 49 days (159 hd)
  - 2011 – 43 days (123 hd)

Forage Production

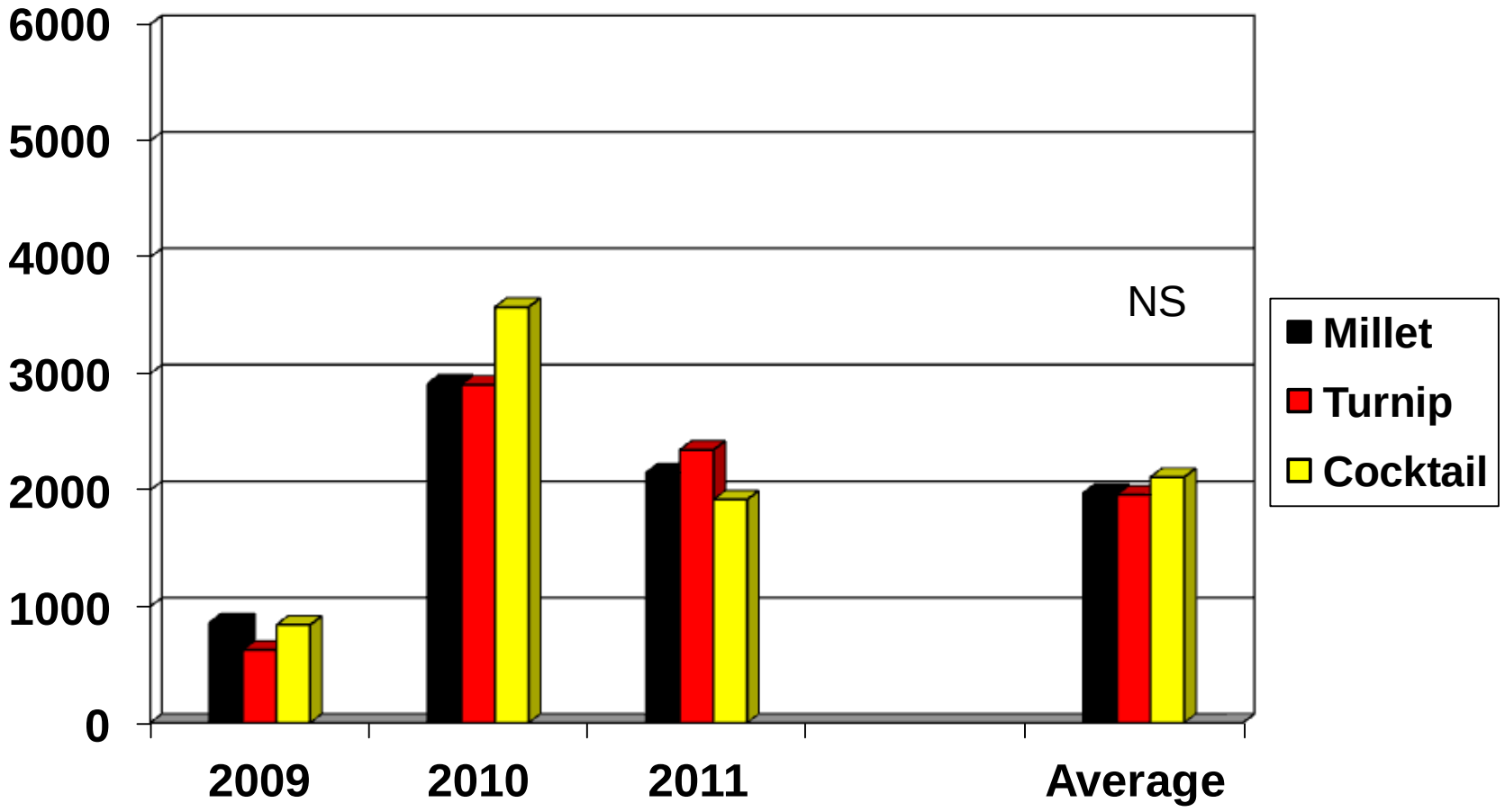
Single Crop Production (lb/ac)



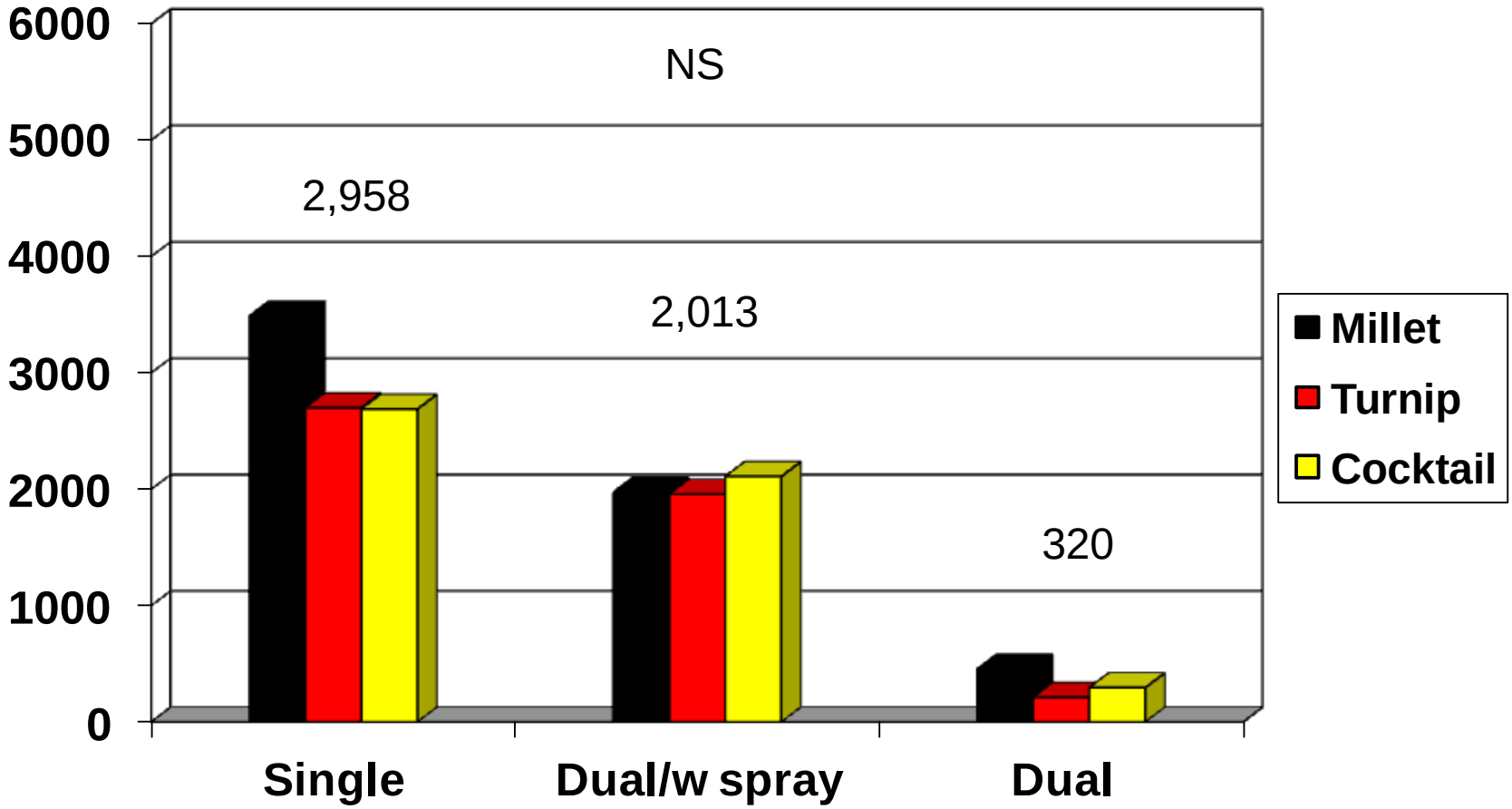
Dual-Crop Production (lb/ac)



Dual-Crop w/ Spray (Glyphosate) Production (lb/ac)

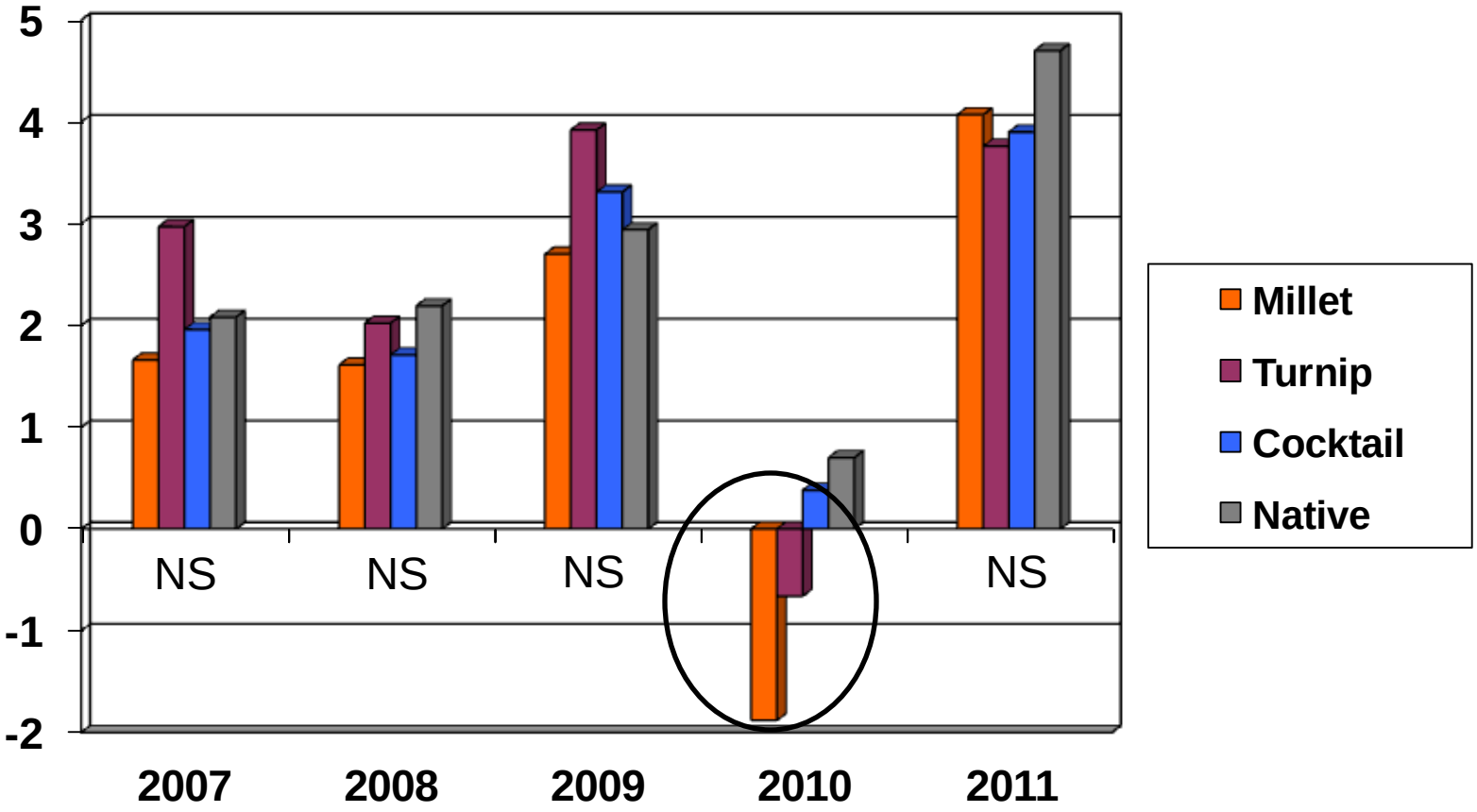


Single vs Dual-Cropping Systems (2009 – 2011)




Livestock Performance

Average Daily Gain (ADG)



ADG was affected by treatment in 2010. (p=0.0019)

Snow significantly impacted livestock performance in 2010

Economics
Production Costs + Custom Rates

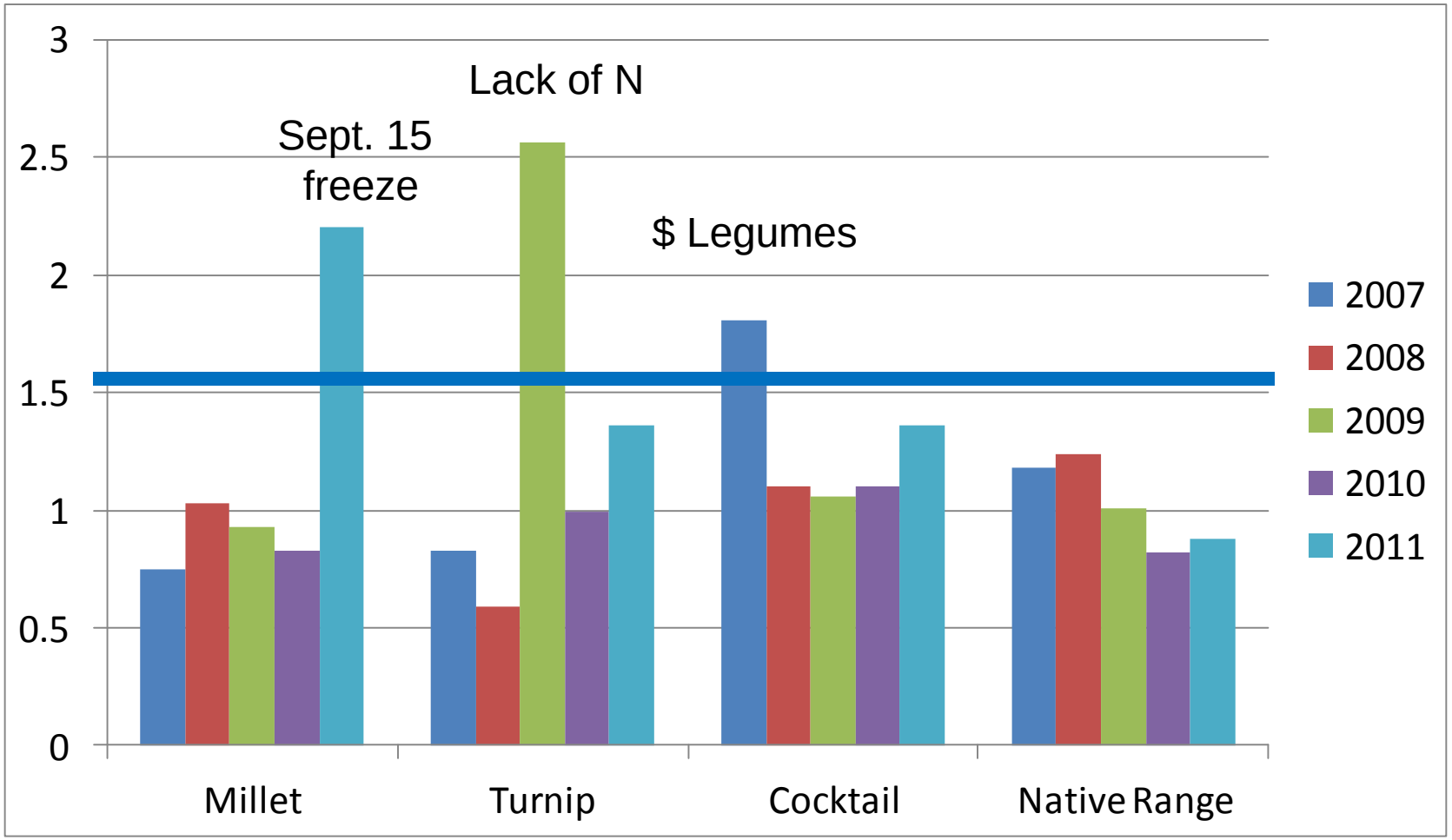
- ND Agri. Stat. Serv.
  - Land Rent (CROP)
    - $27.10/ac in 2007
    - $30.40/ac in 2008, 2009
    - $30.30/ac in 2010
    - $32.50/ac in 2011
  - Land Rent (PASTURE)
    - $14.90/ac in 2007
    - $16.50/ac in 2008, 2009
    - $17.00/ac in 2010
    - $17.10/ac in 2011

- ND Agri. Stat. Serv.
  - Tillage and Seeding
    - $12.73/ac
  - Spray application
    - None to $9.69/ac, depending on treatment and year

Production Costs – Actual Costs

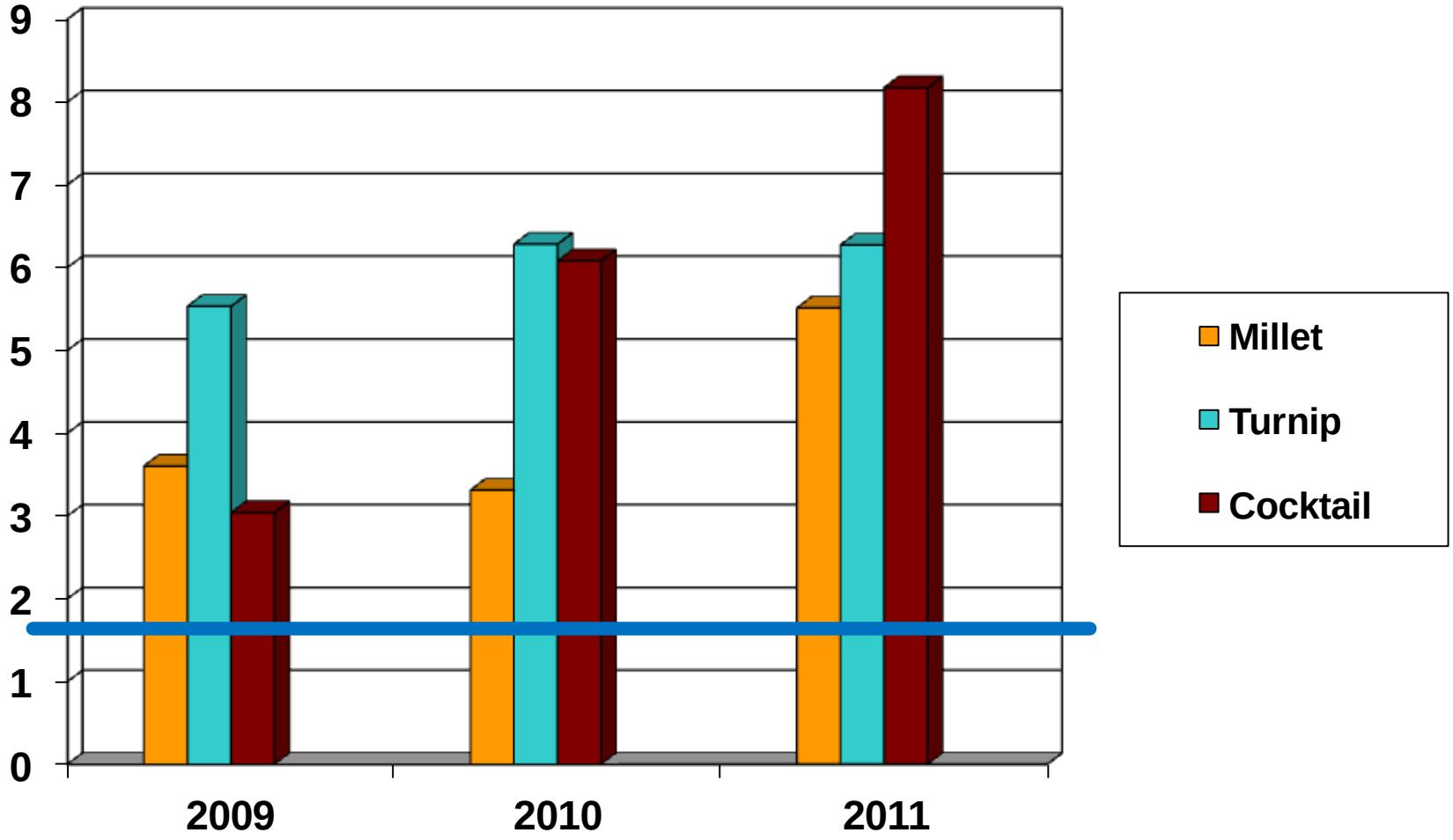
- Fertilizer – 2007
  - $4.38
    - 50/50 Urea & 11:52
  - $4.10 application
- Fertilizer – 2008, 2009, 2011
  - None
- Fertilizer – 2010
  - $14.35
    - 100 % Urea
  - $4.04 application
- Weed Control
  - None to $14.00/ac, depending on treatment and year
- Seed Costs

Grazing Cost – Single Crop ($/hd/d)



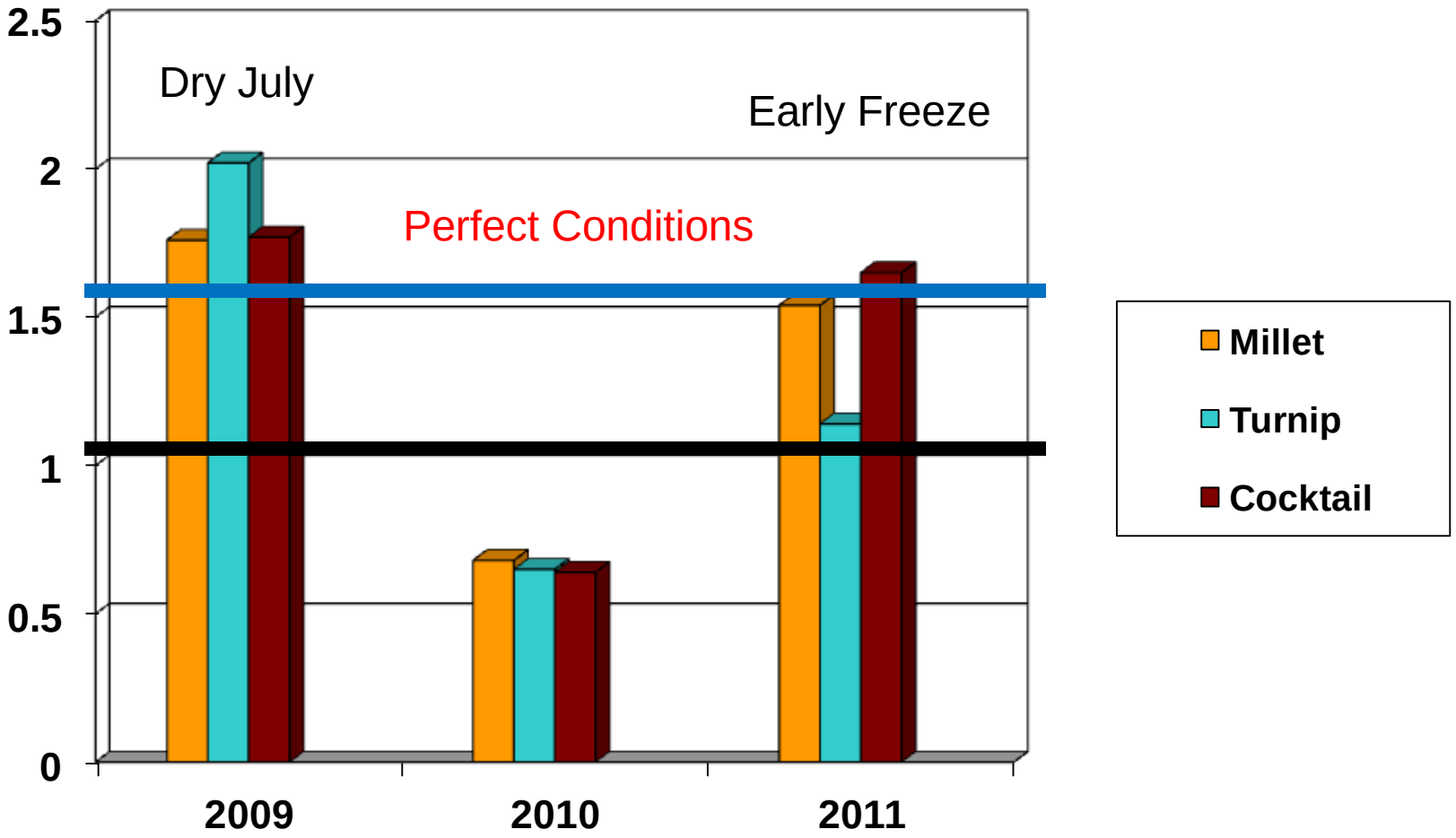
Blue line represents average cost to dry lot a cow per day (NASS 2011)

Grazing Cost – Dual Crop ($/hd/d)



Blue line represents average cost to dry lot a cow per day (NASS 2011)

Grazing Cost – Dual Crop w/ Spray ($/hd/d)



Blue line represents average cost to dry lot a cow per day (NASS 2007)

Black line represents average cost to native range

SO, is Cover Crop use for Late-season Grazing Cost-Effective?

YES – NO (Function of Risk) Recommendations

- Herbicide application essential in a dual-crop system

- In years of below average moisture, dual-cropping systems will lack 2nd crop production

Recommendations

- Use "Low Cost Legumes" in cocktail mixtures when seeded in July or later
- Use "Low Cost Cereal Grains" in cocktail mixtures when seeded in July or later
- DO NOT use warm-season crops in a cocktail mixture if seeding after August 1, and not as a single crop after July 15

Recommendations

- Provide adequate fertilization (N) to achieve high forage production for both single and dual cropping systems

- Use a cool-season legume in cocktail mixtures if seeding after July 15

Questions