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Extension Rangeland Management Specialist  
North Dakota State University

### Nutritional Quality of Selected Annual Forages used for Cover Crops

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#### Central Grasslands Research Extension Center Research Trial near Streeter, ND from 2007 - 2010

- Tested 8 annual forages either: 1) Single or 2) Cocktail Mixture Crops and 3) Native Range
  - 3 Warm-season annuals
  - 6 Cool-season annuals
  - 5 Legumes
- Warm-season
  - Seeded early to late July
- Spring Cereals
  - Mid to late July
- Brassicas
  - Mid to late July
- Legumes
  - Mid to late July

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#### Towner County Demonstration Trial near Mylo, ND in 2009

- Tested 16 annual forages plus 2 Cocktail mixtures
  - 4 Warm-season annuals
  - 8 Cool-season annuals
  - 4 Legumes
- Warm-season
  - Seeded mid June
- Spring Cereals
  - Seeded mid May
- Brassicas
  - Seeded mid July
- Winter Cereals
  - Seeded early August
- Legumes
  - Seeded mid July

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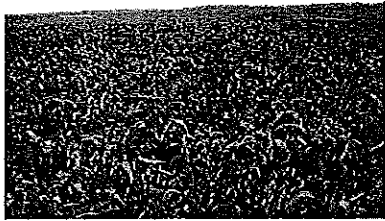
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### Forage Production and Cost




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### Forage Production - Annual Grasses near Mylo, 2009

Annual Spring Planted Forages	Lb/ac	Seed Cost/ac (\$)	Seed cost/100 lb of forage (\$)
Foxtail Millet	5,797	7.00	0.12
Siberian			
Sorghum-Sudan BMR	8,084	11.80	0.15
Foxtail Millet German	5,591	8.80	0.16
Sudangrass - Piper	6,535	17.00	0.26
Forage Oats	4,670	7.60	0.16
Forage Barley	5,199	35.00	0.67
Spring Trifoliate	4,785	15.00	0.31

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### Forage Production - Annual Legumes near Mylo, 2009

Annual Spring/Summer Planted Legumes	Lb/ac	Seed Cost/ac (\$)	Seed cost/100 lb of forage (\$)
Forage Soybean	4,981	50.00	1.01
Hairy Vetch	4,372	20.00	1.46
Field Peas	5,112	19.00	1.70
Cow Peas	421	50.00	11.88

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### Forage Production - Annual Legumes near Mylo, 2009

Annual Spring/Summer Planted Legumes	Lb/ac	Seed Cost/ac (\$)	Seed cost/100 lb of forage (\$)
Forage Soybean	5,863	50.00	0.85
Hay Vetch	1,372	20.00	1.46
Field Peas	1,321	30.00	1.76
Cow Peas	421	50.00	11.88

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### Forage Production - Selected Annuals near Milo in 2009

Annual Late-Season Forages	Lb/ac	Seed Cost/ac (\$)	Seed cost/100 lb of forage (\$)
Turnips - Pisa	1,132	7.89	0.36
Turnips - Purpletop	1,776	6.30	0.36
Cocktail Mix 1	1,765	10.68	0.61
Radish	1,695	20.00	1.18
Cocktail Mix 2	1,823	23.28	1.28
Winter Rye <sup>1</sup>	1,050	30.00	1.86
Winter Triticale <sup>1</sup>	1,189	50.00	3.36

<sup>1</sup> Fall Production ONLY  
 Cocktail 1: Turnip, radish, oats, millet, hairy vetch  
 Cocktail 2: Turnip, radish, triticale, sorghum-sudan, cow pea

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### Average Forage Production - Annual Crops near Streeter, 2007-2010

Annual Spring/Summer Planted Legumes	Lb/ac	Seed Cost/ac (\$)	Seed cost/100 lb of forage (\$)
Boxtail Millet	1,911	7.90	0.40
Turnip	1,801	6.79	0.34
Cocktail	2,687	11.93	0.44
Native Rangeland	1,963		

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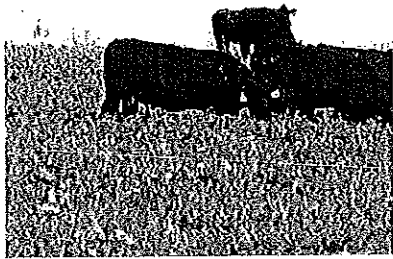
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### Nutritional Value




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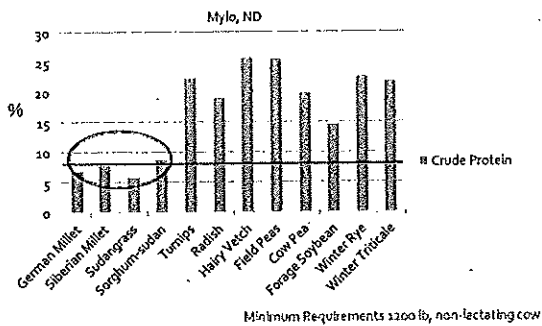
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### Nutritional Quality of late summer, fall winter forages (10-2-2009)




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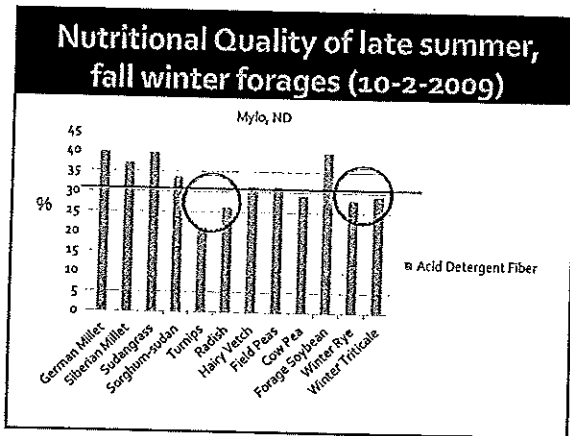
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### Turnips

- Purple top Turnip
  - Bulb type of turnip
- Pasja Turnip
  - Forage type of turnip

The left photograph shows a cow in a field with a large, round, purple-topped turnip. The right photograph shows a cow in a field with a large, elongated, leafy turnip (Pasja type).

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### Turnips

The top-left photo shows a close-up of a turnip root with its leaves. The top-right photo shows a close-up of turnip leaves. The bottom-left photo shows a close-up of a turnip root. The bottom-right photo shows a close-up of turnip leaves.

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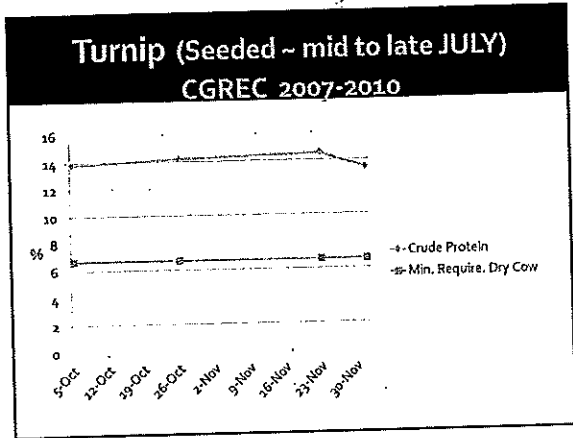
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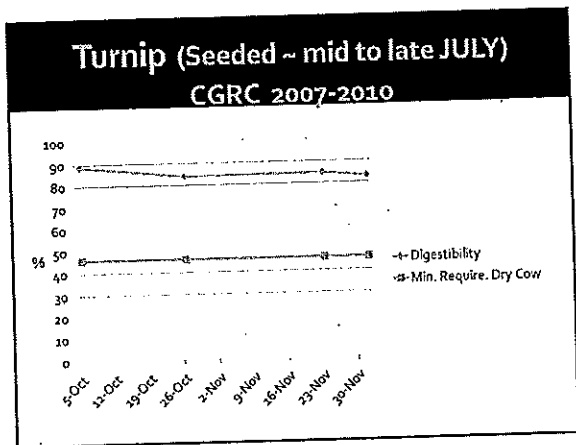
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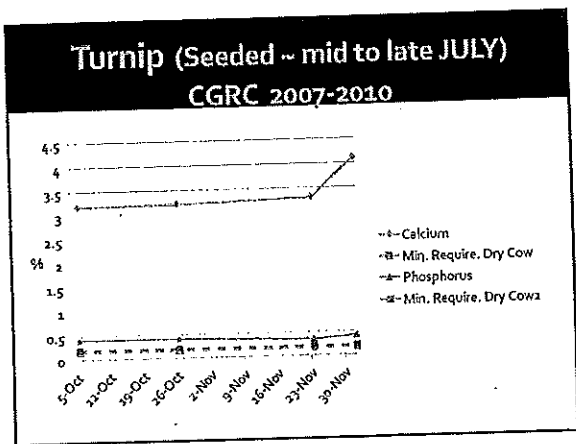
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### Turnip Composition (Purple top and Pasja)

- ▣ Purple Top
  - ▣ Foliage
    - 27% and 32% of production in 2007 and 2009, respectively
- ▣ Pasja
  - ▣ Foliage
    - 61% and 71% of production in 2008 and 2009, respectively

Date	Tops DM	Bulbs DM
Oct 4	~18	~18
Oct 24	~18	~20
Nov 7	~18	~45
Nov 21	~18	~60

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### Purpletop versus Pasja in 2009

- ▣ Pasja
  - ▣ 46% more aboveground foliage in 2009
- ▣ Purpletop
  - ▣ 271% more belowground biomass in 2009

Category	Pasja	Purpletop
Foliage	~2800	~1800
Bulbs	~1000	~3800

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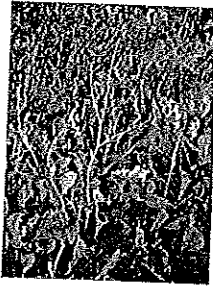
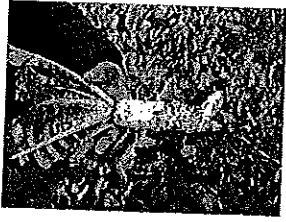
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### Radish

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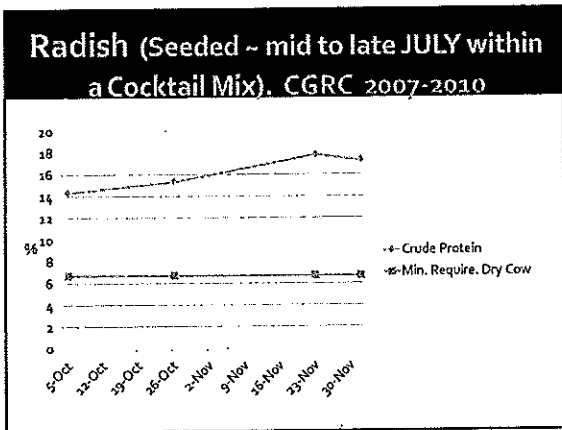
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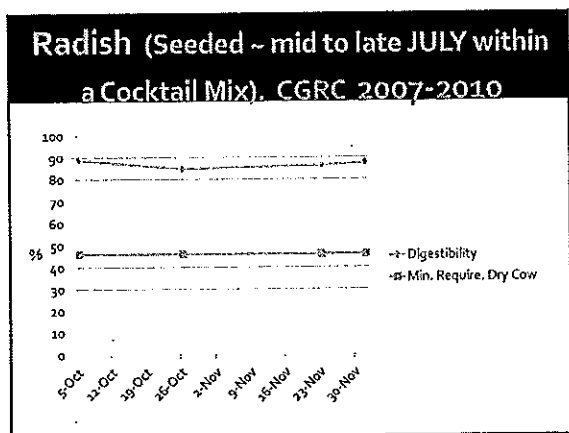
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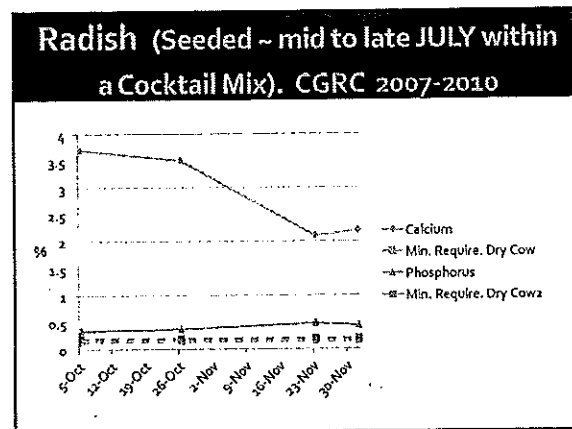
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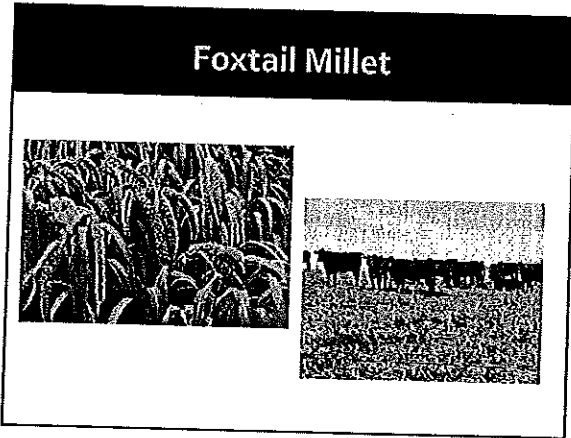
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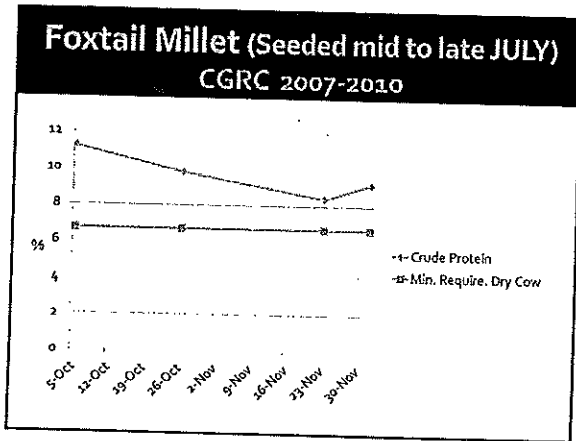
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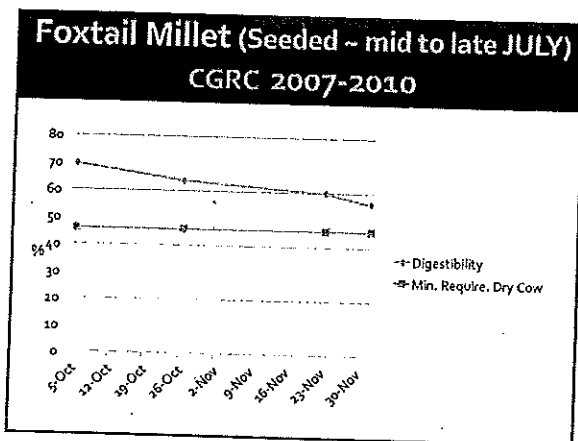
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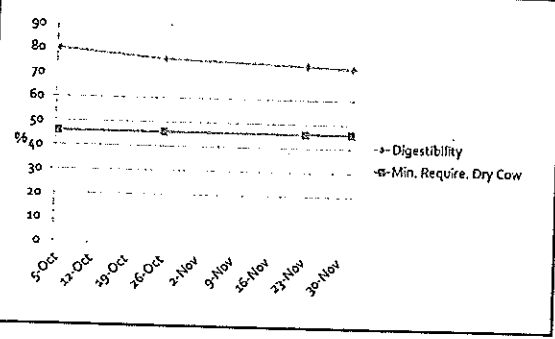
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**Sorghum-sudan (Seeded mid to late JULY within a Cocktail Mix). CGRC 2008-2010**




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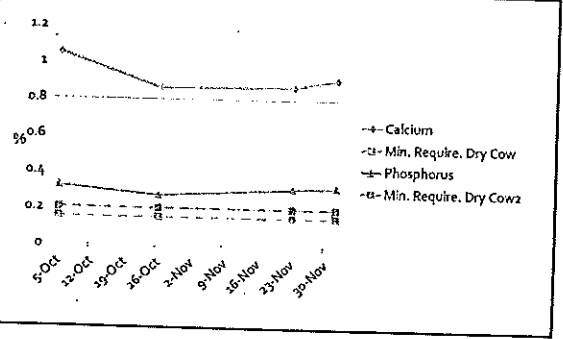
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**Sorghum-sudan (Seeded mid to late JULY within a Cocktail Mix). CGRC 2008-2010**




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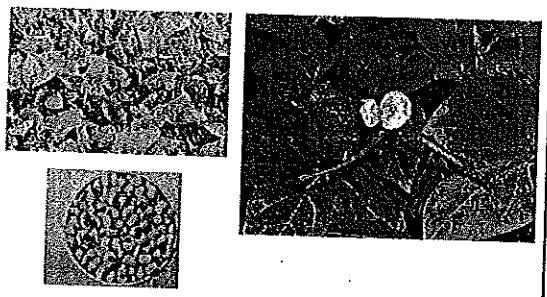
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**Cow Pea (winter warm –season annual)**




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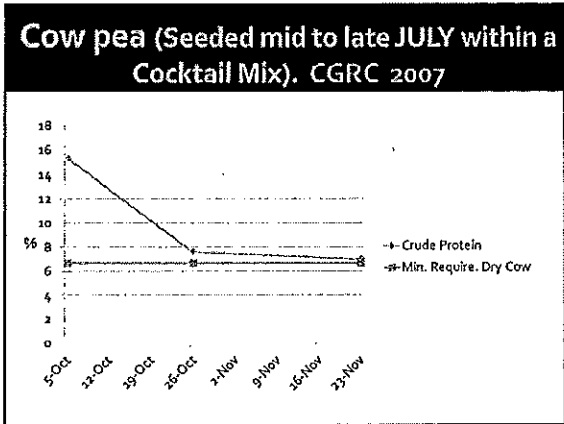
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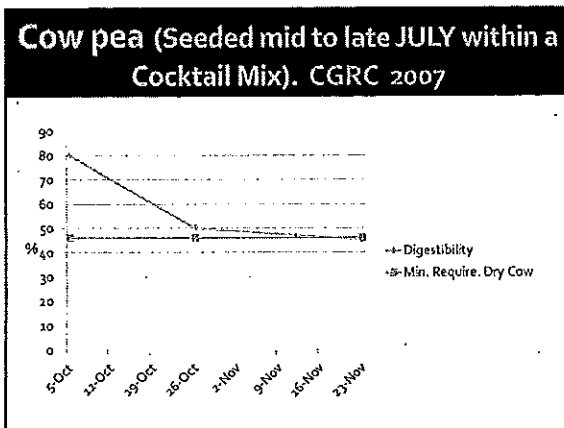
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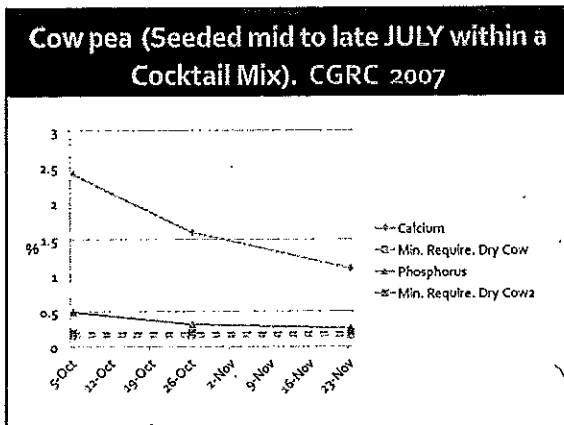
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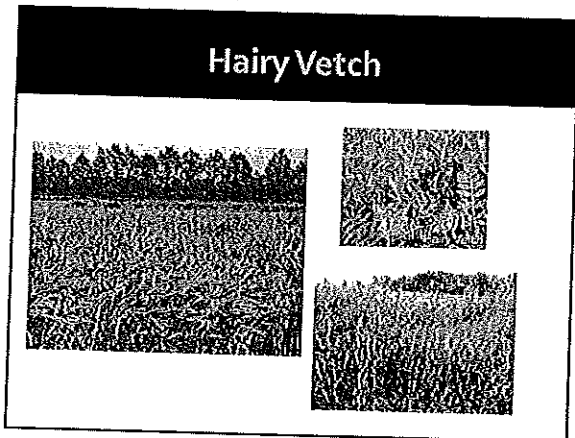
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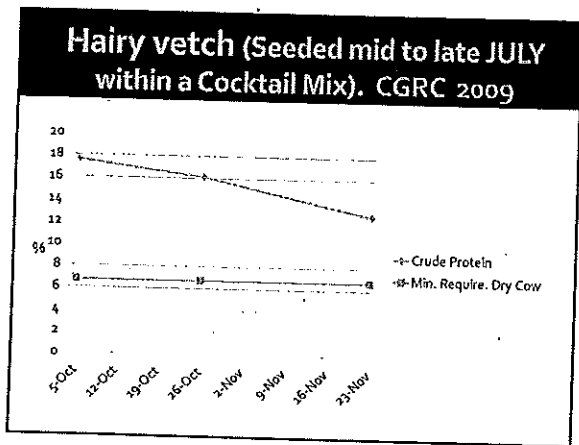
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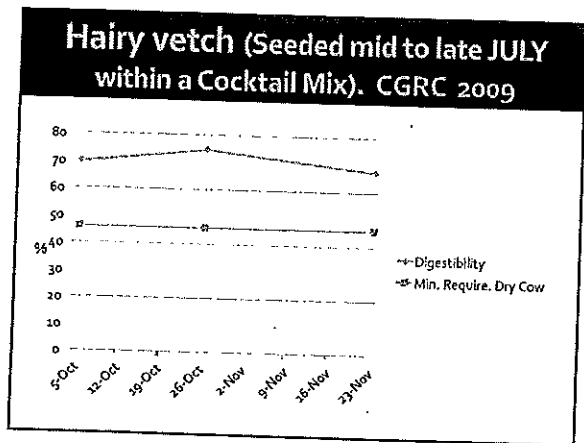
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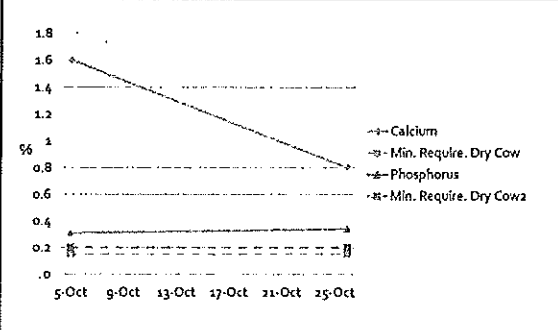
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**Hairy vetch (Seeded mid to late JULY within a Cocktail Mix). CGRC 2009**




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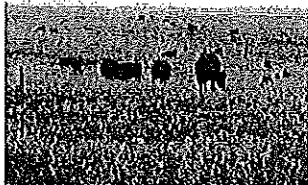
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**Native Range in south central North Dakota**



NDSU Central Grasslands Research Extension Center




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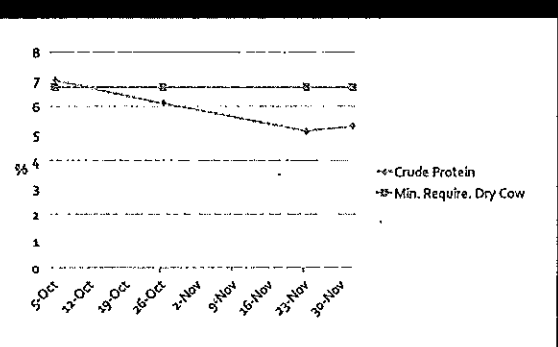
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**Native Range (Grass) CGRC 2007-2010**




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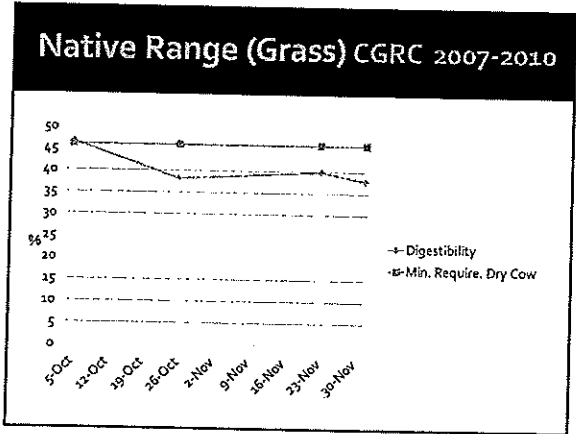
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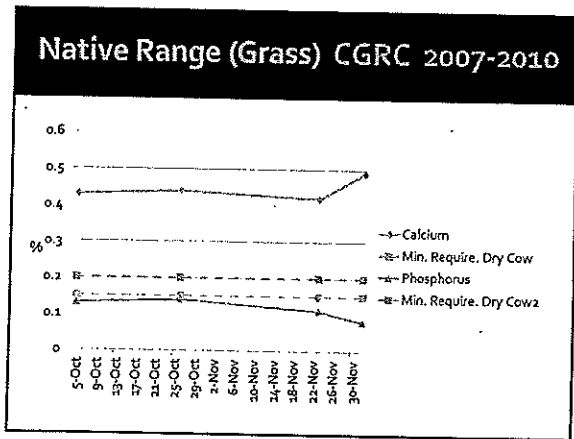
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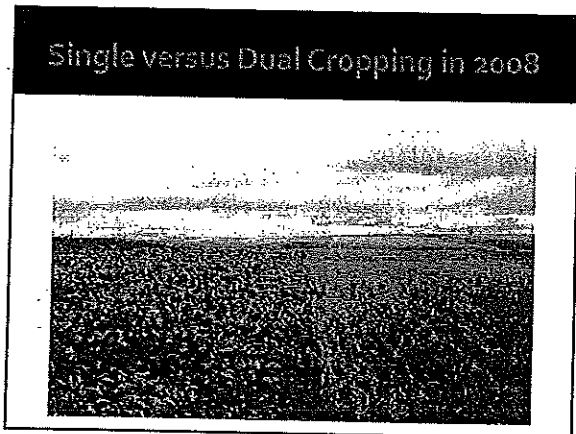
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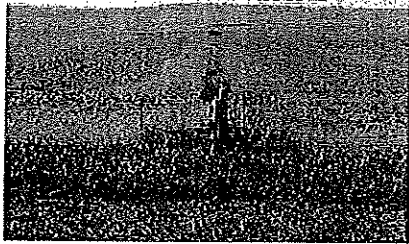
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Single versus Dual Cropping (Burn-down vs Non Burn-down) in 2009



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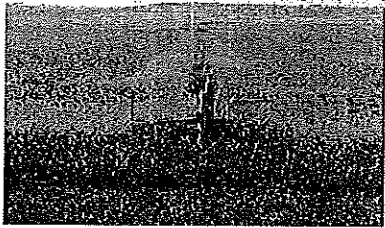
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Any Questions



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