Filling in Forage Gaps

PFI Small Grains Conference

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Superior
Reserve
St. Paul
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Grazing Makes Cents. . .

- Pasture value @ $50/ton = $0.025/ lb DM
- Cow weight 1200 lbs ~ 30 lbs forage/head/day
- 30 lbs X $0.025 = $0.75/head/day
- What if we can graze 365 days/year?
- $273.75
- Who’s is spending this?

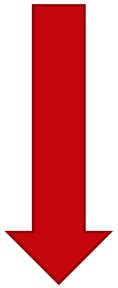
A great year is not feeding hay until Christmas and starting grazing again in Mid April.

University of Minnesota
FINBIN 2018 Beef Cow/Calf – 181 herds

	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
• Total Feed	680	596	505	475	443	397	356	323	274	210
• Corn (Bu.)	58.14	28.58	15.78	10.98	7.61	6.58	4.55	3.63	3.06	1.56
• Silage (tons)	6.69	5.00	4.25	3.38	2.97	2.19	1.66	1.10	0.75	0.08
• Alfalfa (tons)	4.38	2.83	2.12	1.75	1.40	1.07	0.67	0.47	0.14	0.05

Grass hay prices reported to USDA from selected states.			
	Forage Quality Grade		
Location	Premium	Good	Fair
	$ per ton		
Alabama	100-300	90	N/A
California	210	170	N/A
Colorado	310-340	125-265	N/A
Idaho	150-160	N/A	N/A
Iowa	N/A	130-185	88-134
Kansas	140-155	85-150	75-85
Minnesota	135-160	80-135	75-90
Missouri	N/A	100-140	60-100
Montana	175-270	110-180	100-125
Nebraska	165-170	90-100	N/A
Oregon	200-250	N/A	N/A
Pennsylvania	195-400	115-270	110-245
South Dakota	133	95-110	73-110
Texas	165-200	100-145	N/A
Washington	273(d)	243(d)-253(d)	213(d)-228(d)
Wisconsin	N/A	110-150	N/A
Wyoming	190-250	190	N/A

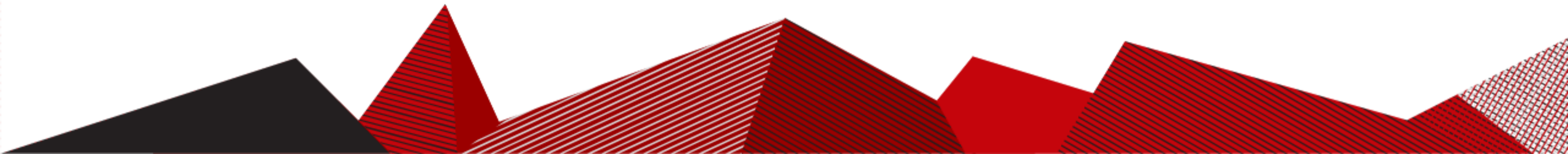
- Harvested Feeds
- Grazed Annual Pasture
- Managed & Grazed Perennial Pasture



Costs

Grazing more days per year and feeding less stored feed has large economic impact.

Graze Year Round?



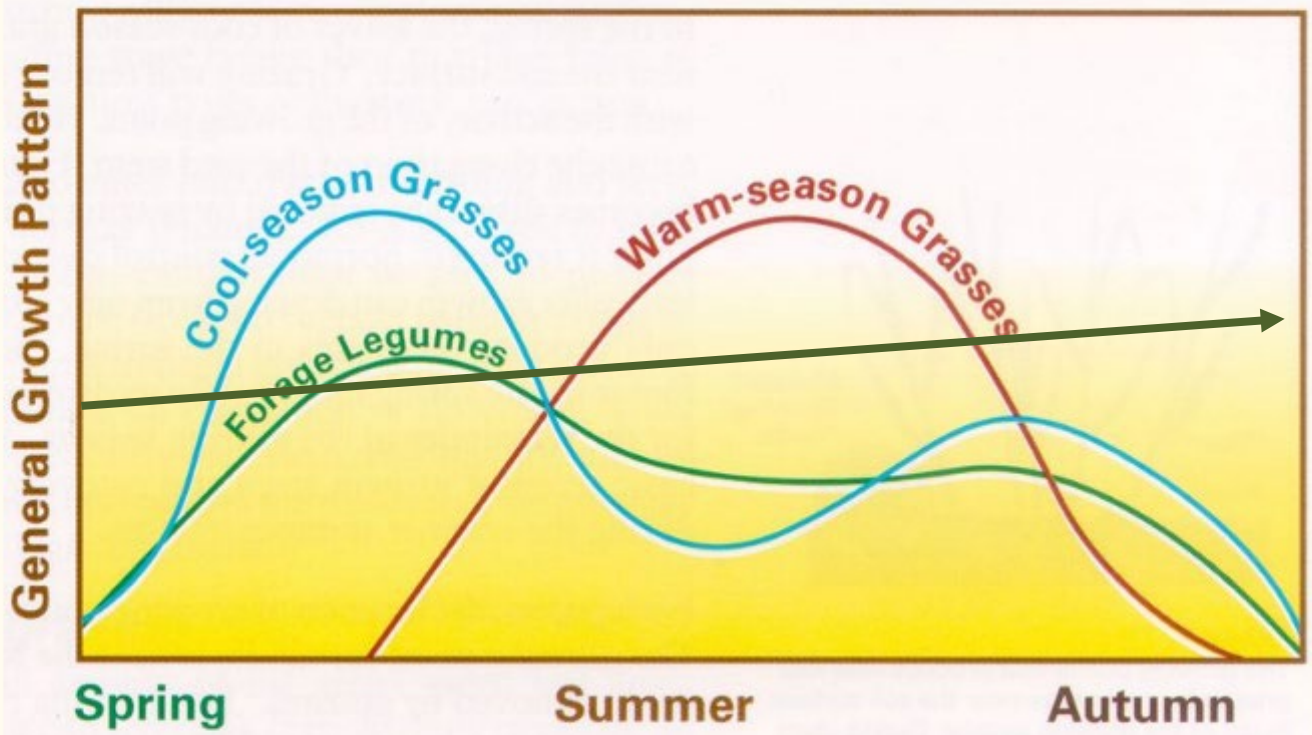


Figure 5
Pasture plants can vary greatly in their pattern of growth. Some producers find that pasture production is more uniform when legumes are grown with grasses, or when a warm-season grass is available for summer grazing.

From Pasture Management Guide

To Fill in Gaps, We Have a Couple Options . . .

- Reduce Forage Demand - Depopulate a portion of the herd
- Increase Forage Supply - Add in additional fields (crop/hay ground)
  - Stockpile forage
  - Plant something. . .

Stockpile Grazing (Deferrred Grazing)

- Growing forage and holding for future grazing
  - There needs to be adequate forage and acres available
  - Summer and fall stockpile

- Start in August, early August provides the most tons
- Minimum 6 weeks before end of growing season
- ~18-20:1 response rate to N fertilizer. 200 lbs urea = 1650 lbs of additional grass. ASSUMING – adequate moisture and NOT Kentucky Bluegrass
- Best Species – Tall Fescue, Meadow Fescue, Orchardgrass, Brome.

Legume/Grass Silage Report - Standard

PROUDLY USING NIRSC EQUATIONS

Report Number: 4839 *Lab Number: 11082* *Sample Description: Fall Pasture Forage*
Material: Legume or Grass Silage
Harvest date: 11/3/2014

Item	Abbreviation	Unit	Result	Method[1]
Dry Matter	DM	% as fed	27.59	WC
Moisture		% as fed	72.41	C
Protein Fractions				
Crude Protein	CP	% DM	20.28	NIR
Soluble Crude Protein	SCP	% CP	37.51	NIR
Rumen-Undegraded Protein	RUP	% CP	23.11	NIR
Rumen-Degraded Protein	RDP	% CP	76.89	C
Acid Detergent Fiber Crude Protein	ADF-CP	% DM	0.69	NIR
Neutral Detergent Fiber Crude Protein	NDF-CP	% DM	5.94	NIR
Heat Damaged Protein-Estimated		% DM	0.69	C
Adjusted Crude Protein		% DM	20.28	C
Fiber Fractions				
Acid Detergent Fiber	ADF	% DM	20.27	NIR
Neutral Detergent Fiber	aNDF	% DM	38.26	NIR
Lignin, Acid Detergent	ADL	% DM	3.73	NIR
Lignin, Acid Detergent	ADL	% aNDF	9.75	C
Neutral Detergent Fiber Digestibility, 48 h	NDFD	% aNDF	67.94	NIR
Carbohydrates and Fats				
Non Fiber Carbohydrate	NFC	% DM	35.41	C
Fat		% DM	2.95	NIR
pH				NA
Energy Calculations: 2001 NRC				
Total Digestible Nutrients, 1X	TDN	% DM	72.78	C
Net Energy, Lactation, 3X	Nel	Mcals/lb	0.75	C
Net Energy, Maintenance	NEm	Mcals/lb	0.84	C
Net Energy, Gain	NEg	Mcals/lb	0.55	C
Metabolizable Energy	ME	Mcals/lb	1.27	C
Relative Forage Quality	RFQ		223.18	C
Milk/Ton		lbs	3,719	C

Macro Minerals				
Phosphorus	P	0.41	% DM	NIR
Calcium	Ca	0.89	% DM	NIR
Potassium	K	3.24	% DM	NIR
Magnesium	Mg	0.40	% DM	NIR
Sodium	Na		% DM	NR
Chloride	Cl		% DM	NR
Sulfur	S		% DM	NR

Micro Minerals				
Iron	Fe		ppm	NR
Manganese	Mn		ppm	NR
Zinc	Zn		ppm	NR
Copper	Cu		ppm	NR
Ash		9.04	% DM	NIR

[1] WC = wet chemistry
NIR = near infrared spectroscopy
NR = not requested
NA = not available
C = calculated
T = tabular value

Methods used for these analyses can be found at http://uwlab.soils.wisc.edu/procedures.htm

Stockpile Grazing

- Urea $44/acre
- Spreading cost $6
- Total $50
- ~ 1850 lbs DM
- ~$55-60/ton variable cost

Frost Seeding Red Clover into Winter Small Grains

Frost Seeding Red Clover

- As soon as snow cover is off on frozen ground
- Seeding Rate – 10-12 lbs per acre
- Seed Cost $3.00/lb, ~$30-36/acre plus seeding
- Average Yield – 1.7 tons
- ~$24/ton
- N Credit – 80 lbs
- https://ipcm.wisc.edu/download/pubsNM/RedClover_0109.pdf

Plant Something - Using Small Grains to Fill in Forage Gaps

- Early Spring
- Summer
- Late Summer
- Fall

- Oats/Barley – Early Spring/ Summer/Late Summer
- Spring Wheat/Triticale - Early Spring
- Winter Rye/Wheat/Triticale - Late Summer/ Fall

Spring Seeding

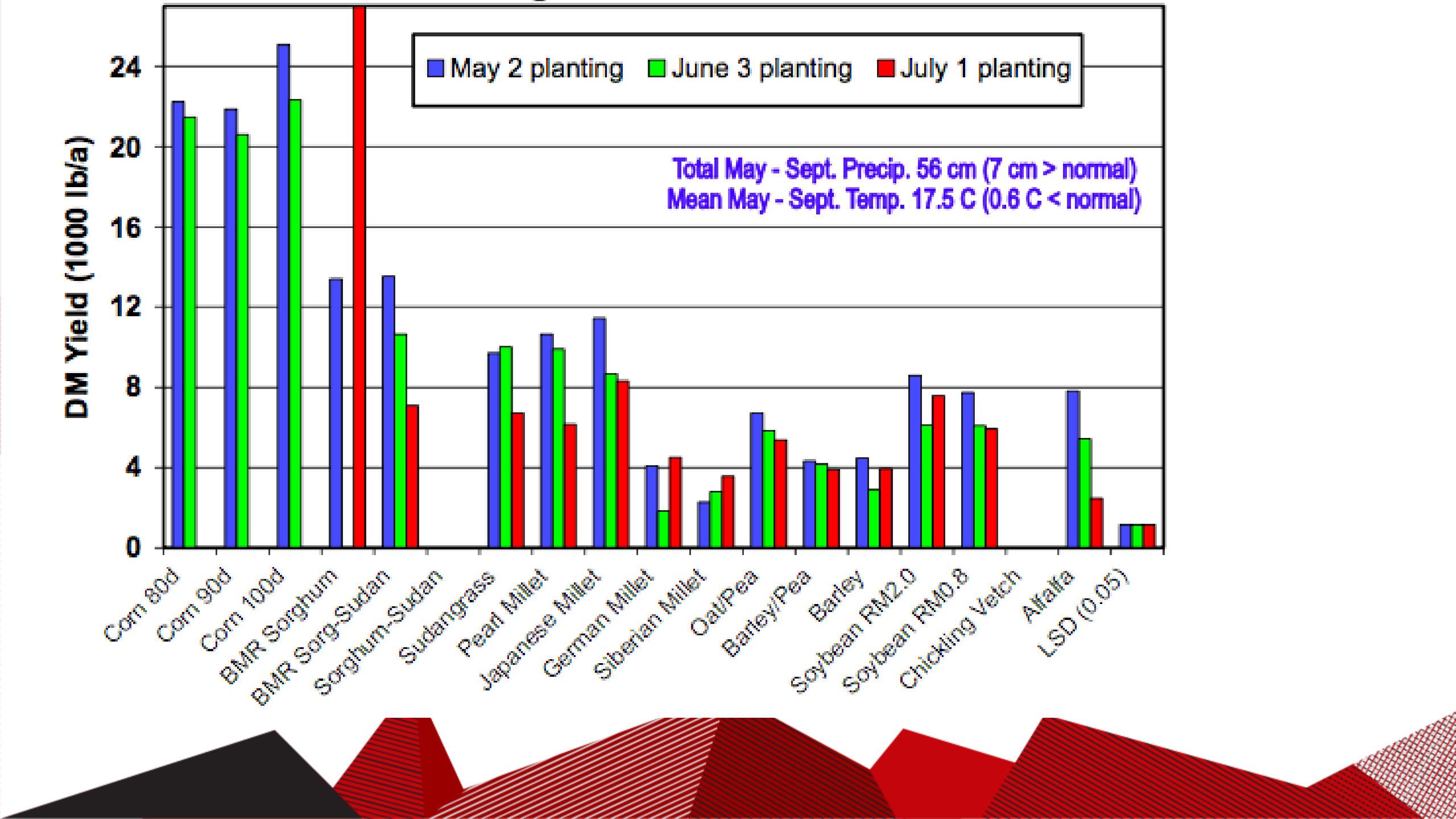
- ~43 F soil temperature
- 50-75 lbs of N
- Ready to graze 45-60 days later
- Start @ ~6 inch height
- Forage Yield – 1.5- 2.5 Tons (at boot stage)

Warm Season Summer Annual Options – Graze or Harvest

- Sorghum (forage only)
- Sorghum-Sudan
- Sudan Grass
- Millet – German, Pearl, Japanese
- Teff Grass

Planting Dates
Soil Temperature
Soil Moisture
Rainfall patterns
Soil
Heat Units

Need more heat than corn, take 30% less moisture


May 2 planting
June 3 planting
July 1 planting
Total May - Sept. Precip. 56 cm (7 cm > normal)
Mean May - Sept. Temp. 17.5 C (0.6 C < normal)
DM Yield (1000 lb/a)
0
4
8
12
16
20
24
Corn 80d
Corn 90d
Corn 100d
BMR Sorghum
BMR Sorg-Sudan
Sorghum-Sudan
Sudangrass
Pearl Millet
Japanese Millet
German Millet
Siberian Millet
Oat/Pea
Barley/Pea
Barley
Soybean RM2.0
Soybean RM0.8
Chickling Vetch
Alfalfa
LSD (0.05)

- Sorghum – 15 lbs/acre
- Sudan – 25 lbs/acre
- Millets – 25 lbs
- BMR Trait
- Brachytic dwarf trait
- Teff Grass – 5 lbs

Legume/Grass Silage Report - Standard

PROUDLY USING NIRSC EQUATIONS

Report Number: 3940 *Lab Number: 6385* *Sample Description: Blotz*
Material: Small Grain Silage
Harvest date: 9/23/2011

Item	Abbreviation	Unit	Result	Method[1]
Dry Matter	DM	% as fed	26.01	WC
Moisture		% as fed	73.99	C
Protein Fractions				
Crude Protein	CP	% DM	10.05	NIR
Soluble Crude Protein	SCP	% CP	49.59	NIR
Rumen-Undegraded Protein	RUP	% CP	27.12	NIR
Rumen-Degraded Protein	RDP	% CP	72.88	C
Acid Detergent Fiber Crude Protein	ADF-CP	% DM	0.00	NIR
Neutral Detergent Fiber Crude Protein	NDF-CP	% DM	3.09	NIR
Heat Damaged Protein-Estimated		% DM	0.00	C
Adjusted Crude Protein		% DM	10.05	C
Fiber Fractions				
Acid Detergent Fiber	ADF	% DM	33.28	NIR
Neutral Detergent Fiber	aNDF	% DM	56.90	NIR
Lignin, Acid Detergent	ADL	% DM	2.75	NIR
Lignin, Acid Detergent	ADL	% aNDF	4.83	C
Neutral Detergent Fiber Digestibility, 48 h	NDFD	% aNDF	52.95	NIR
Carbohydrates and Fats				
Non Fiber Carbohydrate	NFC	% DM	27.35	C
Fat		% DM	2.24	NIR
pH				NA
Energy Calculations: 2001 NRC				
Total Digestible Nutrients, 1X	TDN	% DM	60.35	C
Net Energy, Lactation, 3X	Nel	Mcals/lb	0.62	C
Net Energy, Maintenance	NEm	Mcals/lb	0.62	C
Net Energy, Gain	NEg	Mcals/lb	0.36	C
Metabolizable Energy	ME	Mcals/lb	1.01	C
Relative Forage Quality	RFQ		114.28	C
Milk/Ton		lbs	2,699	C

Macro Minerals				
Phosphorus	P	0.25	% DM	NIR
Calcium	Ca	0.23	% DM	NIR
Potassium	K	1.48	% DM	NIR
Magnesium	Mg	0.21	% DM	NIR
Sodium	Na		% DM	NR
Chloride	Cl		% DM	NR
Sulfur	S		% DM	NR

Micro Minerals				
Iron	Fe		ppm	NR
Manganese	Mn		ppm	NR
Zinc	Zn		ppm	NR
Copper	Cu		ppm	NR
Ash		6.55	% DM	NIR

[1] WC = wet chemistry
NIR = near infrared spectroscopy
NR = not requested
NA = not available
C = calculated
T = tabular value

Methods used for these analyses can be found at http://uwlab.soils.wisc.edu/procedures.htm

Challenges

- Soil Temperature
- Temperature
- Seed Depth
- Stubble height, needs 8 inch residual
- Prussic Acid
- Nitrates (after drought/heavily N fertilized fields)

Summer Seeded Spring and Winter Grains

- Ed Oplinger, UW Small Grains Specialist, 1990’s
- Wayne Coblentz, USDA ARS-DFRC

Late Summer Seeding

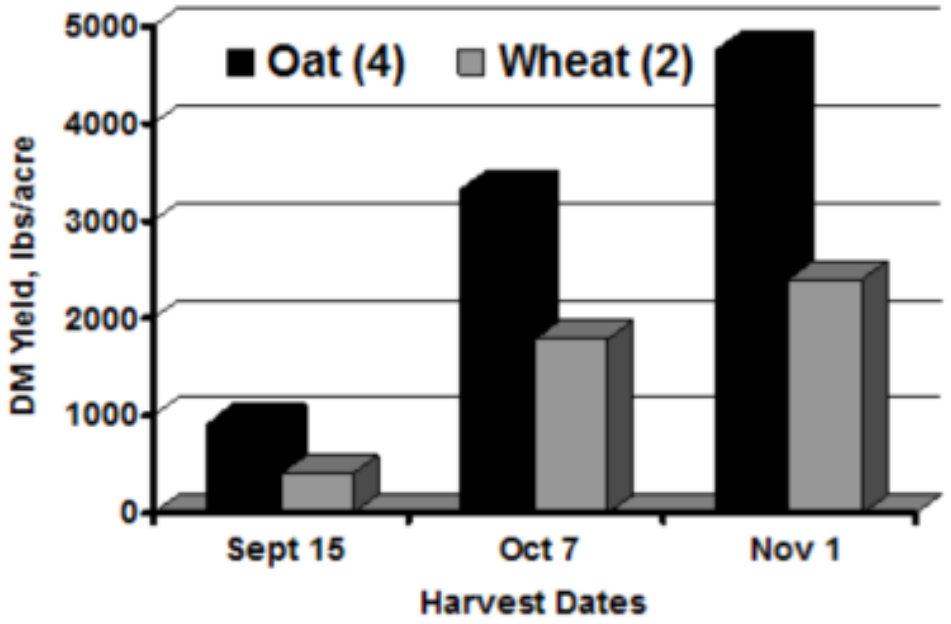


Figure 1. Yield comparisons of (2) winter wheat and (4) oat cultivars across three harvest dates during 2006-2007 at Prairie du Sac, WI (Coblentz and Walgenbach, 2010). Cultivars were established on 11 August 2006 and 13 August 2007.

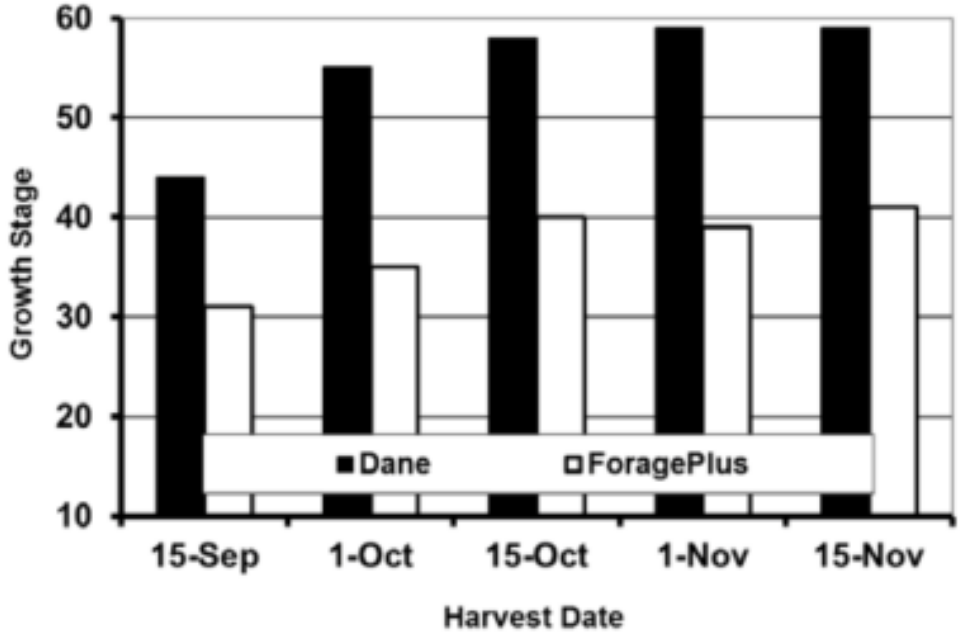


Figure 2. Mean stage of growth for Dane and ForagePlus oat cultivars planted on August 1 at Marshfield, WI (Coblentz et al., 2011). Growth stages are defined as: tillering, 20-29; stem elongation, 30-39; booting, 40-49; and heading 50-59.

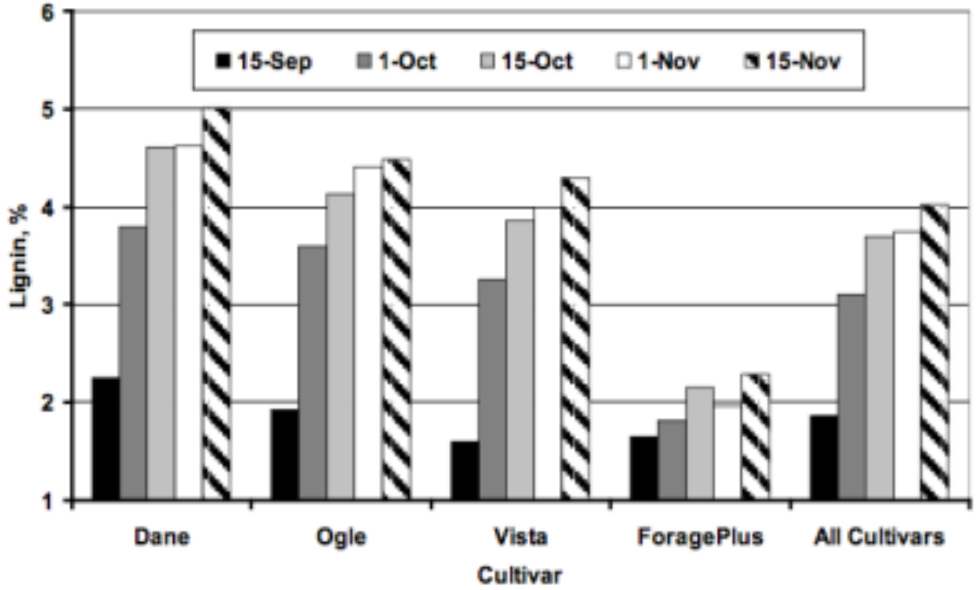
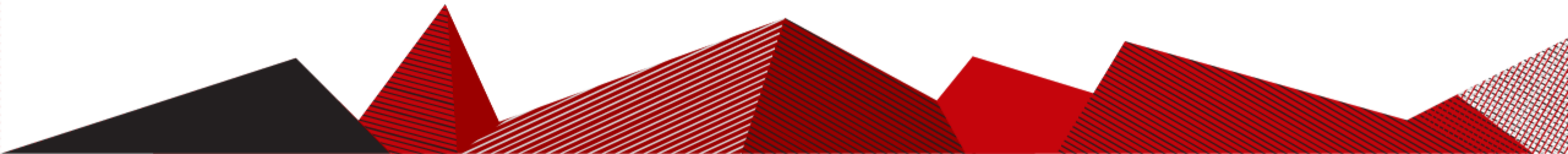


Figure 2. Concentrations of lignin from oat forages planted on August 1 and harvested on five dates throughout the fall at Marshfield, WI (Coblentz et al., 2012).

Forage Oats – Forage Plus, Everleaf, Goliath, Buck, etc.

- Seeding 2-3 bushel
- Seed costs – $10-12 bu
- Total Seed - $20-36/acre
- Drill - $15/acre
- All in $35-51/acre
- Yield – 5000 lbs
- Cost/ton $14 – 20/ton

- Bin Run Oats (germination?)
- Seed Costs - ~$2.70
- Total Seed - $5-8/acre
- Drill - $15
- All in $20-23
- Yield – 4000 lbs
- Cost/ton ~$11/ton



Summer Seeded Spring and Winter Grains – ES Oplinger

- 1.5 bushel spring grain + 1.5 bushel of winter grain seeded in August
  - Lower Fall yield than monoculture of spring grain ~1.7 tons
  - Total yield (Fall and Spring) average 4.5 tons in two grazing seasons.

  - Note: traditional grain varieties not forage varieties of oats/barley used.

Fall Cover Crop Following Small Grain Harvest

Mix: BMR sudangrass, millet, teff, chickling vetch, berseem clover, annual ryegrass, pasja, forage oats

Legume/Grass Hay Report - Standard

PROUDLY USING NIRSC EQUATIONS

Report Number: 5025 *Lab Number:* 9530 *Sample Description:* cover crop
Material: Legume or Grass Hay
Harvest date: 10/5/2009 *Cutting:* 1st

Item	Abbreviation	Unit	Result	Method[1]
Dry Matter	DM	% as fed	64.26	WC
Moisture		% as fed	35.74	C
Protein Fractions				
Crude Protein	CP	% DM	10.55	NIR
Soluble Crude Protein	SCP	% CP		NA
Rumen-Undegraded Protein	RUP	% CP	32.19	NIR
Rumen-Degraded Protein	RDP	% CP	67.81	C
Acid Detergent Fiber Crude Protein	ADF-CP	% DM	0.28	NIR
Neutral Detergent Fiber Crude Protein	NDF-CP	% DM	0.41	C
Heat Damaged Protein-Estimated		% DM	0.28	C
Adjusted Crude Protein		% DM	10.55	C
Fiber Fractions				
Acid Detergent Fiber	ADF	% DM	27.92	NIR
Neutral Detergent Fiber	aNDF	% DM	39.86	NIR
Lignin, Acid Detergent	ADL	% DM	3.43	NIR
Lignin, Acid Detergent	ADL	% aNDF	8.61	C
Neutral Detergent Fiber Digestibility, 48 h	NDFD	% aNDF	79.03	NIR
Carbohydrates and Fats				
Non Fiber Carbohydrate	NFC	% DM	39.03	C
Fat		% DM	1.58	NIR
Energy Calculations: 2001 NRC				
Total Digestible Nutrients, 1X	TDN	% DM	73.50	C
Net Energy, Lactation, 3X	Nel	Mcals/lb	0.76	C
Net Energy, Maintenance	NEm	Mcals/lb	0.85	C
Net Energy, Gain	NEg	Mcals/lb	0.57	C
Metabolizable Energy	ME	Mcals/lb	1.28	C
Relative Forage Quality	RFQ		236.25	C
Milk/Ton		lbs	3,851	C

Macro Minerals				
Phosphorus	P	0.31	% DM	NIR
Calcium	Ca	1.19	% DM	NIR
Potassium	K	2.85	% DM	NIR
Magnesium	Mg	0.29	% DM	NIR
Sodium	Na		% DM	NR
Chloride	Cl		% DM	NR
Sulfur	S		% DM	NR

Micro Minerals				
Iron	Fe		ppm	NR
Manganese	Mn		ppm	NR
Zinc	Zn		ppm	NR
Copper	Cu		ppm	NR
Ash		9.39	% DM	NIR

[1] WC = wet chemistry
NIR = near infrared spectroscopy
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- https://fyi.extension.wisc.edu/forage/altforage/
- https://fyi.extension.wisc.edu/forage/alternative-forage-crops/
- https://fyi.extension.wisc.edu/forage/emergency-forage-options/
- https://fyi.extension.wisc.edu/forage/cereal-forages-for-spring-planting/
- https://coolbean.info/pdf/small_grains/library/forage_production/fall_and_spring_forage_yield_and_quality.pdf

Questions?

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