

Nutritional Value of Cover Crops

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ILLINOIS

Extension

COLLEGE OF AGRICULTURAL, CONSUMER
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UI Research and Demonstration

Summer Annual Forages

CFAR-IL-LIFT DATA Oct. 1, 2003-Oct. 31, 2007

Species	# Samples	DM Yield	CP %	TDN %	RFV
Sudangrass	14	3585	15.1	60.2	89.6
BMR Sudangrass	13	3142	18.5	68.7	101.5
Sorghum Sudan	45	2258	19.7	66.2	103.5
BMR Sorghum Sudan	12	3784	18.8	63.9	97.1
Pearl Millet	21	2473	18.7	64.1	111.9
Pearl Millet & Pasja	9	2912	20.5	62.9	97.9

Sexten, Ballard, CFAR, U of I- 2003-2007

UI Research and Demonstration

Cereal Grains and Brassicas

CFAR-IL-LIFT Oct. 1, 2003 to Oct. 31, 2007 – Average Feed Analysis

Species	Sample	DM	CP%	TDN	RFV
Appin-Sp. Oats & Rye	29	6,367	21.3	67.8	171
Seven-Tops-Spring Oats & Rye	5	8,678	21.8	67.7	170
Purple Tops	5	10,660	24.9	68.9	159
Barkant & Spring Oats	9	7,041	29.0	74.8	193
Barkant & Rye	2	7,758	26.0	77.5	195

UI Research and Demonstration

2016 Orr Center Research-Planting Date

- Planting Date
 - July 27, August 16, August 30, September 15
- Drilled, no tillage into wheat stubble
 - 20 lb. oats
 - 2.5 lb. rape
 - 2.5 lb. turnips

UI Research and Demonstration

2016 Orr Center Research Planting Date

Planting Date	PD	Days old	% DM	Average DM lbs. per acre	CP	TDN	RFV	Total lbs. CP/acre	Total lbs. TDN/acre
7/27/2016	1	64	19.1	2340	10.8	63	124	254	1479
8/16/2016	2	69	17.6	2305	14.3	72	217	330	1666
8/30/2016	3	62	15.1	2176	17.2	75	299	374	1621
9/15/2016	4	46	15.3	1127	27.7	75	268	312	846

UI Research and Demonstration

2016 Orr Center Research- Mixes

- Cover crops drilled-in after corn harvest
- 2 different planting dates
 - Sept 7th, Sept 21st
- 2 different mixes
 - Simple mix:
 - Turnip (.75lb.), Rape (.75lb.), Radish (1.5lb), Oats (50lbs.)
 - Complex mix
 - Turnip (.75lb.), Rape (.75lb.), Radish (1.5lb), Oats (32lbs.), Red Clover (1.5lb), Crimson Clover (1.5lb), Winter Peas (10lbs.) Cow peas (10 lbs.)

UI Research and Demonstration

2016 Orr Center Research- Mixes

- Planted Sept 7th and Sept 21st
- Picture taken Oct 6th



UI Research and Demonstration

2016 Orr Center Research- Mixes

- Complex vs. Simple (sampled 12/2/16)
 - **Early Complex – 2644 lbs. DM/acre**
 - **Early Simple- 1963 lbs. DM/acre**
 - **Late Complex- 1219 lbs. DM/acre**
 - **Late Simple- 658 lbs. DM/acre**
- Simple mix:
 - Turnip (.75lb.), Rape (.75lb.), Radish (1.5lb), Oats (50lbs.)
- Complex mix
 - Turnip (.75lb.), Rape (.75lb.), Radish (1.5lb), Oats (32lbs.), Red Clover (1.5lb), Crimson Clover (1.5lb), Winter Peas (10lbs.) Cow peas (10 lbs.)

UI Research and Demonstration

2018 Ewing Demonstration Center – Summer Annual Forages

- Forage Sorghum (GW-400 BMR) and Pearl Millet (Tifleaf III) planted after oats, oats & peas, or oats & alfalfa
 - 3 replicates per treatment
- Planted 7/11/18 with drill at ½" depth
 - Sprayed SelectMax (clethodim) at 14 oz/A immediately after planting
- Drilled summer forages into residue of oat and oat/pea treatments as well as alfalfa stubble
 - Alfalfa stand establishment in spring was poor in areas
 - Samples taken from areas with good stand establishment to represent ideal conditions

UI Research and Demonstration

2018 Ewing Demonstration Center – Summer Annual Forages

- Sampled in late boot/ early heading stage (variable maturity) on 9/13/18



UI Research and Demonstration

2018 Ewing Demonstration Center – Summer Annual Forages

Treatment	DTH	Lbs DM/A	CP	TDN	RFV
PM	64	5787 B	9.0 B	50.3 D	67.7 C
PM after O&P	64	5634 B	8.1 B	55.3 BC	73.7 C
PM+A	64	4899 B	8.2 B	53.0 CD	72.3 C
FS	64	9349 A	7.9 B	51.7 CD	71.0 C
FS after O&P	64	9502 A	7.2 B	58.3 AB	88.3 B
FS+A	64	9015 A	7.4 B	60.3 A	86.7 B

UI Research and Demonstration

2016 Ewing Demonstration Center – Clover Cover Crops

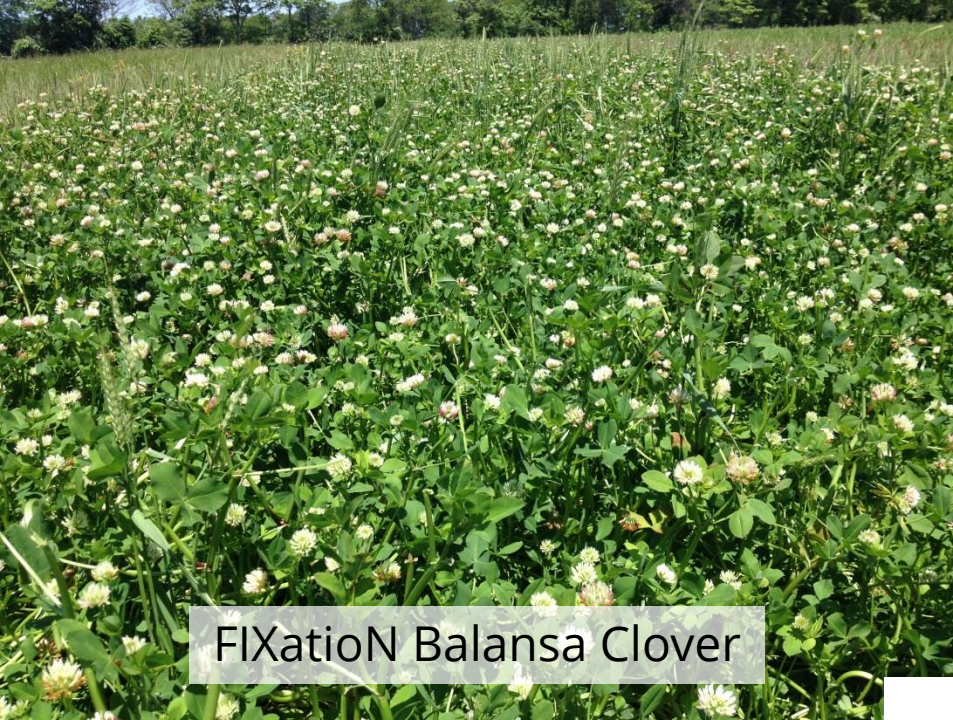
- Cover Crop Planted: 9/24/2015
 - No Cover
 - FLXatioN Balansa Clover 8 lbs/A
 - Kentucky Pride Crimson Clover 15 lbs/A
 - Frosty Berseem Clover 15 lbs/A
 - Dixie Crimson Clover 15 lbs/A
- Termination: 5/13/2016
- Corn planting: 6/9/2016
- Goals: Trial was targeted for corn production; however, good biomass data.

UI Research and Demonstration

2016 Ewing Demonstration Center – Clover Cover Crops

- Fall Sampling - 11/11/2015; Spring Sampling - 5/13/2016





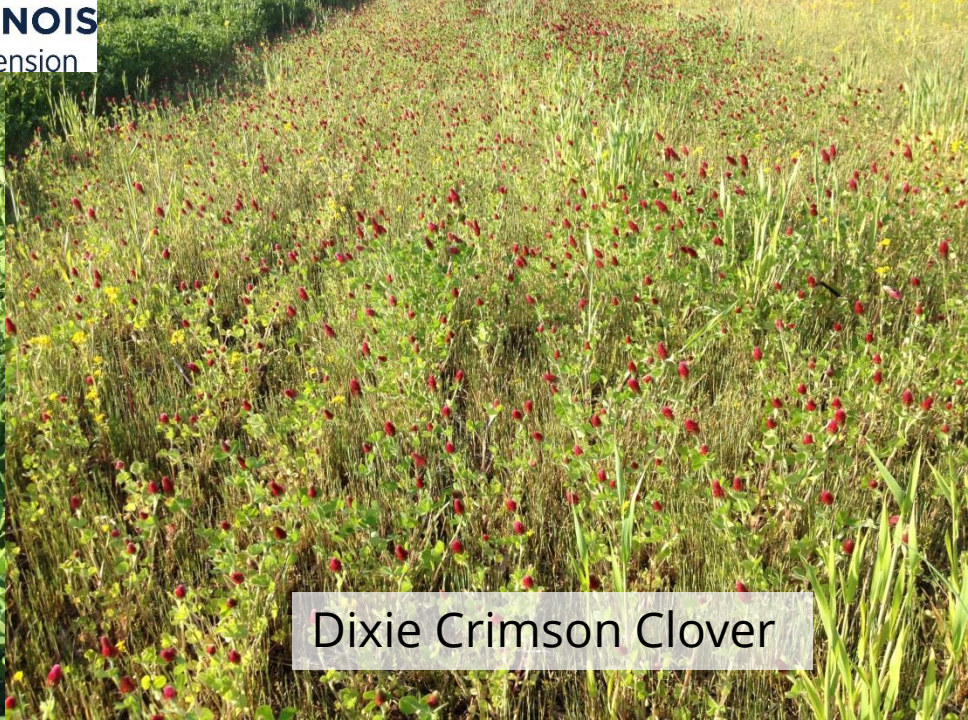
FIXation Balansa Clover



Kentucky Pride Crimson Clover



Frosty Berseem Clover



Dixie Crimson Clover



Treatments	Fall Biomass (green; lbs/A)	Spring Biomass (dry; lbs/A)	Nitrogen in Biomass (lbs/A)
No Cover	0	0	
FIXation			
Balansa Clover	693	8,401	269
Kentucky Pride Crimson Clover	2,777	4,150	52
Frosty Berseem Clover	1,798	6,093	187
Dixie Crimson Clover	2,291	911	14

Nutritional Considerations

Prussic Acid Poisoning

- **What is it?**
 - Hydrocyanic Acid
 - Lack of oxygen carrying capacity in the blood
 - Respiratory failure, death
- **What causes it**
 - Grazing young plants
 - Less than 24" tall
 - Drought stunted plant
 - Frosted plants
 - Super high fertility (Nitrogen) soils

Nutritional Considerations

Prussic Acid Poisoning

- **Seen in what plant species?**
 - Sorghums, Sudans, Johnsongrass, shattercane, wild black cherry trees
- **Treatment**
 - IV with Sodium Nitrite or Sodium Thiosulfate
- **Prevention**
 - Allow safe grazing heights
 - Remove animals after a frost
 - Fill animals before turning out again
 - Allow a minimum of 7 days after last frost to turnout

Nutritional Considerations

Nitrate Poisoning

- **What is it?**
 - Occurs when the diet nitrate concentration exceeds the rumen's ability to convert nitrates into ammonia. Nitrite is absorbed into the blood, thus reducing the oxygen carrying capacity of red blood cells. The animal will eventually suffocate in serious cases. Abortion of fetus due to lack of oxygen can occur.
- **What causes it?**
 - Excessive or high fertility (nitrogen rates)
 - Drought
 - Sudden weather changes
 - High levels of nitrates in the water source
 - Animals eating nitrate accumulating parts of the plant (usually the bottom 1/3 of the stalk).

Nutritional Considerations

Nitrate Poisoning

- **Seen in what plant species?**
 - Sorghums, Sudans, Millets, Cereal Grains, Corn, Teff, Weeds
- **Treatment**
 - IV with methylene blue
- **Prevention**
 - Test forages for Nitrate concentration
 - Ensiling removes close to 50% of nitrate concentration
 - Raise cutting height, the bottom of the plant
 - Allow a minimum of 7 days after last frost to turnout
 - Dilute the diet with low nitrate feeds

Nutritional Considerations

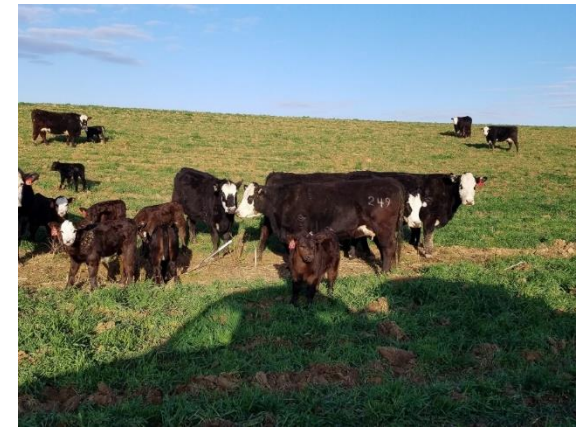
Grass Tetany

- **What is it?**

- Nutritional disorder involving low blood magnesium. Fast-acting, many times hard to catch. Negatively impacts the nervous system. Often referred to as “grass staggers.” Animals may struggle to stand, thrash, and have their head thrown back.

- **What causes it?**

- Diet low in Mg
- Diet that interferes with Mg absorption
- High levels of milk production
- Often occurs on lush, rapidly growing forage



Nutritional Considerations

Grass Tetany

- **Seen in what plant species?**
 - Any lush forage, Brassicas, Grasses, etc.
- **Treatment**
 - IV with calcium and magnesium
- **Prevention**
 - Supplement Mg in mineral or feed
 - Ensure salt is available free choice
 - Supplement lush pastures with energy and dry matter

Nutritional Considerations

Bloat

- **What is it?**

- Excess gas accumulation in the rumen. Usually animals are seen swelling on their left side just in front of the hook bone.



- **What causes it?**

- Failure to eructate excess gas
 - Acidosis- usually grain overload or overprocessed grains
 - Frothy bloat- pasture, usually high legumes or very lush forage
 - High amount and rate of intake
 - Lack of physical fiber to stimulate cud chewing

Nutritional Considerations

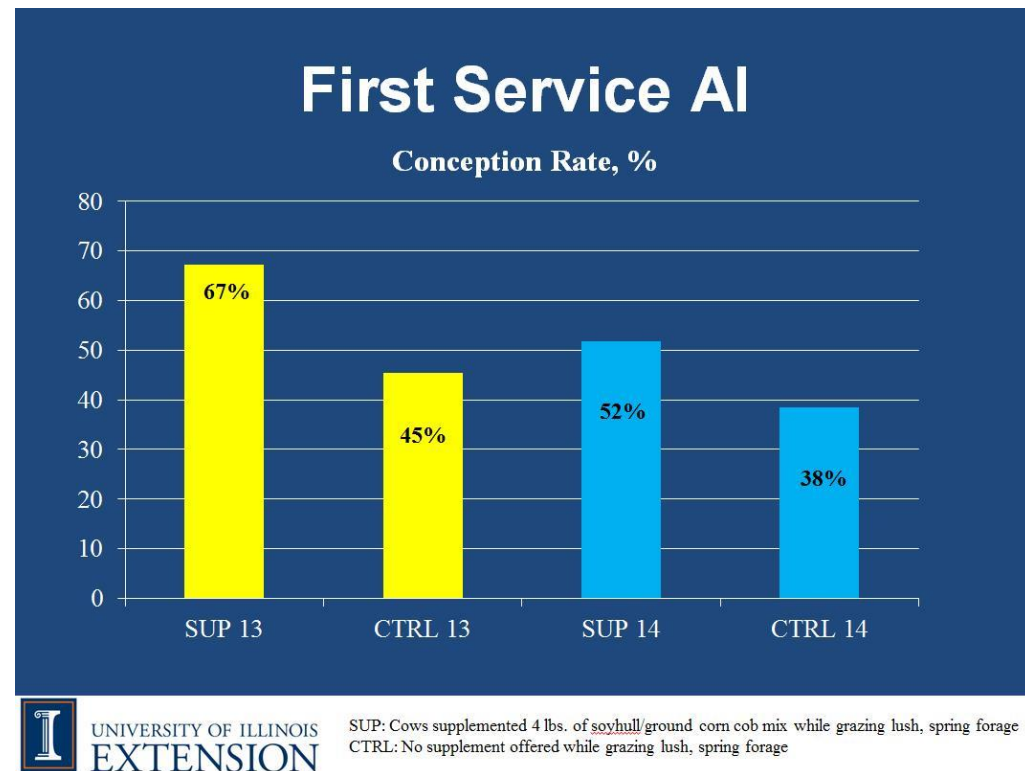
Bloat

- **Seen in what plant species?**
 - Any lush forage, Legumes, Brassicas, Grasses, etc.
- **Treatment**
 - Removal of gas via stomach tube or trocar
 - After removal of the gas, an antifoaming agent can be drenched
- **Prevention**
 - Feed long-stem roughage with lush forage
 - Consistent feeding times, and uniform forage access
 - Utilize anti-bloating feed additives

Nutritional Considerations

High Protein, Low Fiber, Wet Diets

- Consider Supplementing
 - Dry, Low Protein, Good Energy
- Grass Hay
- Palatable Cornstalk Bale
- Corn/Soy hulls



Nutritional Considerations

Poor Fermentation Silages

- **Poor fermentation = Poor palatability**
 - Usually lack of bacteria or lack of sugars/fermentable carbohydrate
 - Poor pack density
- **Clostridium bacteria**
 - Can occur when fermentation is poor. Has rancid smell
- **Lack of Lactic Acid Bacteria**
 - Needed inoculant, more inoculant
 - Will smell like vinegar, alcohol-like
- **Really wet silage can have fermentation issues**
 - >70% moisture can reduce fermentation and cause feed-out issues
 - Butyric acid issues. Slime-like texture. Loss of sugars and higher ADF levels
- **Spoilage**
 - Silage may heat and spoil at a higher rate
 - 2 ft. of the face of the silage bag should be fed per day to avoid excess spoilage

Nutritional Considerations

Nutrient Analysis of Forage

- This is a must!
- Extreme variability
- Harvest at early boot, flag leaf stage
- Yield increases with maturity but, quality declines with maturity



Utilize a Team!!!



Key Points

- **Communication with your insurance agent, seed rep, and agronomist is essential to insure payments, seed availability, and limit herbicide interference.**
- **Utilizing PP acres for forage production via cover crops can produce feed, produce income, and benefit the soil**
- **Seed Shortages are likely. Double check % Pure Live Seed, % weed seed, and germination rates**
- **Look for known varieties for the most consistent performance**
- **Herbicide Residuals can interfere with cover crop establishment**
- **Previous fertility programs can influence yields and nitrate levels in cover crops**
- **Consider harvest method, following crop, and herbicide restrictions before choosing a cover crop or cover crop mix**

Other Valuable Resources

- [“Prevented Planting and Cover Crop Options for 2019” – Practical Farmers of Iowa](#)
- [Prevent Planting Standards Handbook](#)
- [“Cover Crop Options with Prevented Planting Fields” – Iowa State Extension](#)

Other Valuable Resources

- **Midwest Cover Crop Tool**
 - <http://mccc.msu.edu/covercroptool/covercroptool.php#>

Midwest Cover Crops Council - Cover Crop Decision Tool
Illinois: Adams County Seeding Dates

NEW UPDATE!
HOVER OVER COVER CROP, CLICK TO REVIEW THE INFORMATION SHEET.

Location Information: Illinois Adams
Cash Crop: Corn - Grain Plant Date: 04/10/2017 Harvest Date: 09/15/2017
Drainage Information: Select a Drainage Class Flooding: No
Goal #1: Good Grazing Goal #2: Weed Fighter Goal #3: Erosion Fighter

Attribute Ratings: 0-Poor, 1-Fair
2-Good, 3-Very Good, 4-Excellent

Reliable Establishment Freeze Risk to Establishment Frost Seeding

Cash Crop Growing Period: Requires Aerial Seeding or Interseeding of Cover Crop

	Mar 15	Apr 1	Apr 15	May 1	May 15	Jun 1	Jun 15	Jul 1	Jul 15	Aug 1	Aug 15	Sep 1	Sep 15	Oct 1	Oct 15	Nov 1	Nov 15	Dec 1	Dec 15	Jan 1	Jan 15	Feb 1	Feb 15
EROSION FIGHTER																							
WEED FIGHTER																							
GOOD GRAZING																							
NONLEGUMES																							
Buckwheat 0 4 3																							
Millet, Japanese 4 3 4																							
Millet, Pearl 4 3 4																							
Oats, Spring 4 4 4																							
Rye, Winter Cereal 3 4 4																							
Ryegrass, Annual 4 3 4																							
Sorghum-sudangrass 3 4 4																							
Sudangrass 4 4 4																							
Triticale, Winter 4 3 4																							
Wheat, Winter 3 3 4																							
BRASSICAS																							
Mustard, Oriental 1 3 2																							
Radish, Oilseed 3 4 2																							
Rapeseed/Canola 2 3 2																							