

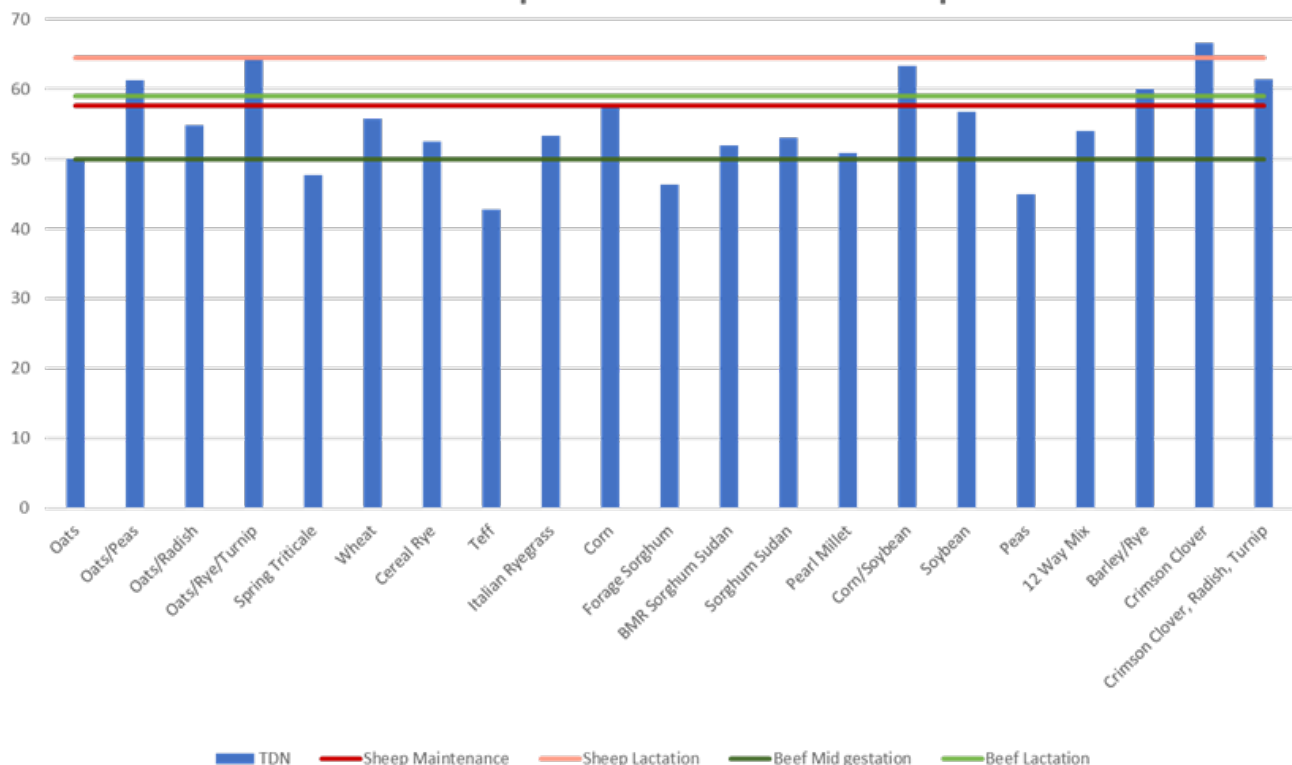
# Cover Crop Summary



Cover crops have been shown to have various benefits, one of these is their ability to provide either planned or emergency livestock forages. During the summer of 2019 many emergency forages were planted on prevent plant acres. One of the challenges with these crops is the lack of knowledge about how their feed values change when planted much later than usual. To help understand these forage nutritional and economic values OSU extension educators collect samples of July planted cover crops that maybe available for feed after approximately 60 days of growth or at the crops ideal harvest growth stage. Forage quality was assessed using wet chemistry testing for Crude Protein, Neutral Detergent Fiber, Ash, and Neutral Detergent Fiber 30 hour digestibility. Energy was calculated using NRC 2001 equations. Some of the crops had 3 or less fields submitted for forage testing. These crops were reported but not included in statistical species comparison.

After the summary table each individual sample field's forage results are posted. Through this study we found a large variation in yield and quality of many of these forage species. Fertilization with nitrogen was found to be a key factor in both yield and quality of grass type species. One of the studies looked at nitrogen fertilization of oats finding at least 46 pounds of nitrogen increased yield over unfertilized oats. While protein and energy content determined the value per ton of forage, the yield was the biggest driver of forage value per acre. Summer annuals corn, forage sorghum, sorghum sudan, and soybeans were found to provide the most return per acre. A few winter annual were planted as part of this study but they did not grow well. Some of the forage mixes provide excellent nutrient value but often had low tonnage. While many of these forages will need supplementation to meet our livestock's nutrient requirements during lactation, many met or exceed maintenance needs. Only four crops spring triticale, teff, forage sorghum, and peas didn't meet the maintenance energy requirements for a mid-gestation beef cow making this an excellent way to feed a beef herd. These crops could easily be supplemented to meet your livestock's nutrient needs during lactation.

**TDN of July Planted forage crops harvested at 47-102 days**  
**Nutrient requirements of Beef and Sheep**



# Cover Crop Summary



## OBJECTIVE

*Delayed planting conditions led many growers to plant cover crops as an emergency forage for mechanical harvest. Average yield and yield ranges for many species can be found below.*



**eFields Collaborating Farm**

OSU Extension

State Wide

Quality Measurement	Tons/Acres		Crude Protein		TDN***	
	Average	St. Error	Average	St. Error	Average	St. Error
Oats	0.85 ± 0.49b	0.12	15.89 ± 5.44ab	1.36	49.96 ± 5.22c	1.31
Teff	1.47 ± 0.68b	0.28	8.97 ± 2.16c	0.88	42.8 ± 5.1c	2.08
Sorghum Sudan	2.39 ± 0.85b	0.23	8.1 ± 1.92c	0.51	52.98 ± 3.55abc	0.95
Corn	9.88 ± 3.8a	1.34	6.8 ± 1.65c	0.58	57.44 ± 6.47ab	2.29
Forage Sorghum	3.28 ± 0.94b	0.42	8.06 ± 3.3bc	1.47	46.26 ± 2.94c	1.32
Pearl Millet	0.97 ± 0.44b	0.15	7.54 ± 1.3c	0.43	50.79 ± 5.34bc	1.78
Corn/Soybean	1.5 ± 1.04b	0.3	13.83 ± 2.45abc	0.71	63.32 ± 2.36a	0.68
Soybean	2.06 ± 0.56b	0.17	24.35 ± 6.54a	1.97	56.75 ± 14.38abc	4.34
Peas	1.11 ± 0.07b	0.04	14.33 ± 2.8abc	1.62	44.87 ± 11.14c	6.43
CV	109.2		52.06		18.45	
<b>Observational samples (less than 3 locations, subsamples reported)</b>						
12 Way Mix	0.55±0.38	0.13	17.59±6.24	2.08	53.93±6.14	2.05
Oats/Peas	0.59±0.21	0.12	22.47±1.11	0.64	61.23±1.45	0.83
Oats/Radish	0.73±0.3	0.11	13.45±1.66	0.59	54.87±1.65	0.58
Oats/Rye/Turnip	0.8±0.09	0.05	22.57±1.1	0.63	64.41±1.35	0.78
Spring Triticale****	1.11±0	0	11.25±1.48	1.05	47.63±1.03	0.73
Cereal Rye****	0.44±0	0	17.95±0.49	0.35	52.43±0.82	0.58
Italian Ryegrass*****	0.85±0	0	11.9±0	0	53.31±0.88	0.62
BMR Sorghum Sudan	1.96±1.01	0.41	9.22±1.86	0.76	51.88±2.29	0.93
Barley/Rye	0.55±0.19	0.1	17.6±1.12	0.56	60.05±0.72	0.36
Crimson Clover	0.31±0.26	0.13	20.38±3.49	1.75	66.65±3.49	1.75
Crimson Clover, Radish, Turnip	0.47±0.21	0.04	15.48±3.55	0.58	61.36±8	1.31

\* Average includes ± Standard Deviation  
 \*\*Energy equations based on NRC 2001 but in vivo NDF digest based on Lopes et al  
 \*\*\*TDN estimated from DE using standard NRC equations  
 \*\*\*\*Dollar value based on SESAME prices from Dec 2019 Buckeye dairy news (MP = 0.35, NEL =0.068, NDF = 0.117)  
 \*\*\*\*\*One location subsamples averaged



**eFields Collaborating Farm**  
OSU Extension

Species	NDF		ASH		Nutrient value per ton of (0.88-1.12 of average)
	Average	St. Error	Average	St. Error	
Oats	52.58 ± 8.31bc	2.08	14.34 ± 3.81a	0.95	226.81-288.66
Teff	65.73 ± 5.79a	2.37	12.25 ± 4.9ab	2	218.56-278.17
Sorghum Sudan	62.72 ± 3.57ab	0.96	8.58 ± 1.02ab	0.27	225.64-287.18
Corn	54.3 ± 12.92bc	4.57	5.67 ± 4.41b	1.56	210.95-268.49
Forage Sorghum	62.22 ± 4.56ab	2.04	11.36 ± 5.21ab	2.33	213.74-272.03
Pearl Millet	60.01 ± 4.78ab	1.59	10.39 ± 5.31ab	1.77	214.65-273.19
Corn/Soybean	47.66 ± 4.38c	1.27	6.14 ± 0.89ab	0.26	230.91-293.89
Soybean	44.67 ± 10.26c	3.09	14.12 ± 11.02a	3.32	250.58-318.91
Peas	46.23 ± 7.6117	4.39	18.68 ± 7.83a	4.52	200.24-254.85
CV	17.18		63.92		226.81-288.66
<b>Observational samples (less than 3 locations, subsamples reported)</b>					
12 Way Mix	44.73±11.67	3.89	14.57±6.45	2.15	222.86-283.64
Oats/Peas	44.73±2.58	1.49	12.84±0.55	0.32	251.35-319.9
Oats/Radish	56.9±3.52	1.25	12.15±1.57	0.55	235.13-299.26
Oats/Rye/Turnip	25.13±1.91	1.1	18.29±2.08	1.2	216.43-275.46
Spring Triticale*****	58.55±0.07	0.05	9.73±0.62	0.44	219.37-279.2
Cereal Rye*****	51.35±0.07	0.05	10.93±1.15	0.81	235.33-299.51
Italian Ryegrass*****	44.25±1.48	1.05	12.12±0.11	0.08	201.24-256.13
BMR Sorghum Sudan	61.63±2.71	1.11	10.16±1.86	0.76	225.49-286.99
Barley/Rye	48.98±0.43	0.22	12.55±0.48	0.24	241.41-307.26
Crimson Clover	26.63±4.14	2.07	13.18±1.51	0.76	215.52-274.29
Crimson Clover, Radish, Turnip	31.06±10.51	1.73	16.3±5.55	0.91	199.29-253.64

Crop Type - Corn/Soybeans



eFields Collaborating Farm  
OSU Extension  
Wayne County

Quality Measurement	Average	St. Error
Tons/ac	0.85±0.71	0.06
CP	13.6±2.22	0.78
NDF	50.4±1.89	0.67
NDFD30	62±0	0.00
Ash	6.54±0.74	0.26
NEL-3x Mcal/lb	0.69±0.02	0.01
TDN	61.89±1.25	0.44
Nutrient \$ value per ton DM	233.50-297.18	

## PROJECT CONTACT

For inquiries about this project, contact Matthew Nussbaum ([nussbaum.53@osu.edu](mailto:nussbaum.53@osu.edu)).



Crop Type - Corn/Soybeans



eFields Collaborating Farm

OSU Extension

Wood County

Quality Measurement	Average	St. Error
Tons/ac	2.8±0.71	0.35
CP	14.28±3.18	1.59
NDF	42.18±1.38	0.69
NDFD30	5.34±0.59	0.29
Ash	0.75±0.01	0
NEL-3x Mcal/lb	66.17±0.74	0.37
TDN	2.8±0.71	0.35
Nutrient \$ value per ton DM	225.73-287.29	

## PROJECT CONTACT

For inquiries about this project, contact Alan Sundermeier ([Sundermeier.5@osu.edu](mailto:Sundermeier.5@osu.edu))

## OBJECTIVE

Determine the yield effect from various nitrogen rates applied to oats.



### eFields Collaborating Farm

OSU Extension  
Sandusky County

Treatment (lbsN/ac)	Yield (tons/ac DM)		Crude Protein		NDF		ASH	
	Value	Significance	Value	Significance	Value	Significance	Value	Significance
92	1.42	A	12.30	A	59.3	A	13.85	B
46	1.28	A	10.17	B	59.4	A	13.32	B
0	0.62	B	8.47	C	61.2	A	18.07	A
LSD		0.586		1.53		3.04		3.64
CV		27.43		7.69		2.63		11.8

Treatment (lbsN/ac)	NEL-3x (Mcal/lb)		TDN		Nutrient Value per ton DM
	Value	Significance	Value	Significance	
92	0.49	A	46.49	A	222.71-283.45
46	0.47	A	45.53	A	214.02-272.39
0	0.35	B	36.36	B	197.21-250.99
LSD		0.061		4.56	
CV		7.23		5.53	

## PROJECT CONTACT

For inquiries about this project, contact Jason Hartschuh (hartschuh.11@osu.edu), Al Gahler (gahler.2@osu.edu), Mike Gastier (gastier.3@osu.edu), or Hallie Williams (williams.6386@osu.edu).



## OBJECTIVE

Determine yield effect of applying various rates of nitrogen and fungicide to oats via a split plot arrangement.



**eFields Collaborating Farm**

OSU Extension

Sandusky County

Treatment (lbs N/ac)	Yield (tons/ac DM)		Crude Protein		NDF		ASH	
0 lbs N, Untreated	0.86	C	9.40	BC	61.86	AB	24.05	A
0 lbs N, Fungicide	0.96	BC	8.25	C	61.4	AB	20.28	AB
46 lbs N, Untreated	1.53	ABC	9.27	BC	63.2	A	19.49	B
46 lbs N, Fungicide	1.96	A	8.67	C	59.83	AB	14.63	CD
92 lbs N, Untreated	1.68	AB	12.33	A	61.47	AB	17.87	BC
92 lbs N, Treated	2.22	A	10.70	B	58.83	B	13.13	D
LSD		0.76		1.73		3.85		4.36
CV		26.83		8.8		3.32		13.54
0 lbs N, Untreated	0.86	C	9.40	BC	61.86	AB	24.05	A

Treatment (lbs N/ac)	NEL-3x (Mcal/lb)		TDN		Nutrient Value per ton DM	
0 lbs N, Untreated	0.34	D	35.38	D	61.86	AB
0 lbs N, Fungicide	0.36	CD	38.24	CD	61.4	AB
46 lbs N, Untreated	0.38	D	38.21	D	63.2	A
46 lbs N, Fungicide	0.46	AB	44.47	AB	59.83	AB
92 lbs N, Untreated	0.43	BC	42.42	BC	61.47	AB
92 lbs N, Treated	0.49	A	46.92	A	58.83	B
LSD		0.05		3.87		3.85
CV		6.89	35.38	5.2		3.32
0 lbs N, Untreated	0.34	D	38.24	D	61.86	AB

Crop Type - Oats



**eFields Collaborating Farm**  
OSU Extension  
Wood County

Quality Measurements	Average	St. Error
Tons/ac	0.69±0.19	0.09
CP	14.55±1.99	1
NDF	55.78±1.98	0.99
NDFD30	12.97±0.63	0.31
Ash	0.58±0.01	0.01
NEL-3x Mcal/lb	53.87±0.91	0.45
TDN	0.69±0.19	0.09
Nutrient \$ value per ton DM	235.02-299.12	

## PROJECT CONTACT

For inquiries about this project, contact Alan Sundermeier ([sundermeier.5@osu.edu](mailto:sundermeier.5@osu.edu)).





Crop Type - Oats/Peas



eFields Collaborating Farm  
OSU Extension  
Wood County

Quality Measurements	Average	St. Error
Tons/ac	0.59±0.21	0.12
CP	22.47±1.11	0.64
NDF	44.73±2.58	1.49
NDFD30	12.84±0.55	0.32
Ash	0.68±0.02	0.01
NEL-3x Mcal/lb	61.23±1.45	0.83
TDN	0.59±0.21	0.12
Nutrient \$ value per ton DM	251.35-319.90	

## PROJECT CONTACT

For inquiries about this project, contact Matthew Nussbaum ([nussbaum.53@osu.edu](mailto:nussbaum.53@osu.edu)).

Crop Type – Oats/Radish



eFields Collaborating Farm  
OSU Extension  
Wood County

Quality Measurement	Average	St. Error
Tons/ac	0.65±0.33	0.17
CP	14.73±1.32	0.66
NDF	54.18±2.78	1.39
NDFD30	13.43±0.87	0.44
Ash	0.62±0.01	0.00
NEL-3x Mcal/lb	56.33±0.73	0.36
TDN	0.65±0.33	0.17
Nutrient \$ value per ton DM	236.25-300.69	

## PROJECT CONTACT

For inquiries about this project, contact Alan Sundermeier ([sundermeier.5@osu.edu](mailto:sundermeier.5@osu.edu)).



Crop Type – Oats/Radish



eFields Collaborating Farm  
OSU Extension  
Wood County

Quality Measurement	Average	St. Error
Tons/ac	0.8±0.29	0.15
CP	12.18±0.62	0.31
NDF	59.63±1.19	0.59
NDFD30	10.87±0.8	0.40
Ash	0.58±0.01	0.00
NEL-3x Mcal/lb	53.41±0.38	0.19
TDN	0.8±0.29	0.15
Nutrient \$ value per ton DM	234.00-297.83	

## PROJECT CONTACT

For inquiries about this project, contact Alan Sundermeier ([sundermeier.5@osu.edu](mailto:sundermeier.5@osu.edu)).

Crop Type – Oats/Rye



eFields Collaborating Farm  
OSU Extension  
Wayne County

Quality Measurement	Average	St. Error
Tons/ac	0.8±0.09	0.05
CP	22.57±1.1	0.63
NDF	25.13±1.91	1.10
NDFD30	18.29±2.08	1.20
Ash	0.73±0.02	0.01
NEL-3x Mcal/lb	64.41±1.35	0.78
TDN	0.8±0.09	0.05
Nutrient \$ value per ton DM	216.43-275.46	

## PROJECT CONTACT

For inquiries about this project, contact Matthew Nussbaum ([nussbaum.53@osu.edu](mailto:nussbaum.53@osu.edu)).



Crop Type – Pearl Millets



eFields Collaborating Farm  
OSU Extension  
Crawford County

Quality Measurement	Average	St. Error
Tons/ac	0.66±0.1	0.05
CP	8.13±0.97	0.49
NDF	57.48±5.66	2.83
NDFD30	8.34±1.1	0.55
Ash	0.6±0.04	0.02
NEL-3x Mcal/lb	54.94±3.34	1.67
TDN	0.66±0.1	0.05
Nutrient \$ value per ton DM	218.06-277.54	

## PROJECT CONTACT

For inquiries about this project, contact Jason Hartschuh ([hartschuh.11@osu.edu](mailto:hartschuh.11@osu.edu)).

Crop Type – Sorghum Sudan



**eFields Collaborating Farm**

OSU Extension  
Crawford County

Quality Measurement	Average	St. Error
Tons/ac	2.95±1.04	0.52
CP	8.85±1.3	0.65
NDF	60.3±1.27	0.64
NDFD30	8.43±0.22	0.11
Ash	0.62±0.01	0.01
NEL-3x Mcal/lb	56.78±1	0.5
TDN	2.95±1.04	0.52
Nutrient \$ value per ton DM	229.32-291.86	

## PROJECT CONTACT

For inquiries about this project, contact Jason Hartschuh ([hartschuh.11@osu.edu](mailto:hartschuh.11@osu.edu)).



Crop Type – BMR Sorghum Sudan



**eFields Collaborating Farm**

OSU Extension  
Wood County

Quality Measurement	Average	St. Error
Tons/ac	1.31±0.14	0.07
CP	10.4±0.37	0.19
NDF	63.35±0.65	0.32
NDFD30	11.29±0.78	0.39
Ash	0.58±0.01	0.00
NEL-3x Mcal/lb	53.32±0.52	0.26
TDN	1.31±0.14	0.07
Nutrient \$ value per ton DM	235.42-299.62	

## PROJECT CONTACT

For inquiries about this project, contact Alan Sundermeier ([sundermeier.5@osu.edu](mailto:sundermeier.5@osu.edu)).

Crop Type – 9-Way Mix



eFields Collaborating Farm

OSU Extension  
Williams County

Quality Measurement	Average	St. Error
Tons/ac	0.29±1.81	0.03
CP	15.38±3.31	0.81
NDF	54.34±1.11	1.48
NDFD30	11.09±0.04	0.50
Ash	0.61±0.01	0.01
NEL-3x Mcal/lb	56.05±0.98	0.44
TDN	0.29±1.81	0.03
Nutrient \$ value per ton DM	238.41-303.43	

## PROJECT CONTACT

For inquiries about this project, contact Stephanie Karhoff ([karhoff.41@osu.edu](mailto:karhoff.41@osu.edu)).





## OBJECTIVE

*Plant multiple species of summer annuals to compare yield potential of crops as a source of winter feed.*



**eFields Collaborating Farm**

OSU Extension  
Sandusky County

Treatment (Species)	Yield (tons/ac DM)	Crude Protein	NDF	Ash	
Corn	4.11a	6.93c	66.0ab		
Sorghum	3.06ab	8.73bc	63.87ab	9.91a	
Teff	1.79b	7.26c	68.47a	13.81a	
Soybeans	1.83b	14.3a	51.17cd	14.53a	
Oats	1.43b	12.23ab	58.73bc	22.73a	
Millet	1.18b	7.53c	63.87ab	14.96a	
Peas	0.098b	14.3a	46.23d	15.43a	
LSD		2.16	3.72	9.67	16.8
CV		59.5	20.74	9.18	60.9

Treatment (Species)	NEL-3x (Mcal/lb)	TDN	Nutrient Value per ton DM
Corn	0.563a	52.25a	227.21-254.48
Sorghum	0.485a	46.4a	219.68-246.04
Teff	0.391a	39.38a	212.86-238.4
Soybeans	0.433a	42.56a	206.58-231.37
Oats	0.439a	43.04a	215.8-241.7
Millet	0.511a	48.38a	218.28-244.47
Peas	0.464a	39.38a	200.24-224.27
LSD			18.45
CV			23.1

## OBJECTIVE

*Determine forage yield and feed quality of various species planted as cover crops on prevented plant acres.*



**NW Ohio Agricultural Research  
and Development Center**  
Wood County

Crop	Yield	CP	NDF	Ash	NEL-3x Mcal/lb
Non BMR Sorghum Sudan	2.57	5.40	60.25	7.14	0.51
Cereal Rye	0.44	17.95	51.35	10.93	0.57
Italian Rye	0.85	11.90	44.25	12.12	0.58
Spring Triticale	1.11	11.25	58.55	9.73	0.50
Pearl Millet	1.59	6.40	59.60	7.77	0.48
Forage Sorghum	3.07	7.05	59.75	7.68	0.48
Oats	1.01	12.80	53.95	10.16	0.49

Crop	TDN	Nutrient \$ value per ton DM
Non BMR Sorghum Sudan	48.05	
Cereal Rye	52.43	203.37-231.09
Italian Rye	53.31	235.33-267.42
Spring Triticale	47.63	201.24-228.69
Pearl Millet	46.10	219.37-249.29
Forage Sorghum	46.05	202.35-229.94
Oats	46.71	204.82-323.75