



# Grazing Cover Crops for Winter Feed

## In a Nutshell

- Cover crops can provide a high-quality, low-cost feed during times when farmers would normally be feeding hay and other stored forages.
  - Dave and Meg Schmidt planted and grazed cover crops and crop residue to extend their grazing season and reduce hay expenses.
  - Over four winter seasons, they have maintained animal performance through feeding a combination of hay and winter grazing.
- ## Key findings:
- Grazing cover crops and crop residue in late fall delayed the onset of regular hay feeding.
  - Cows maintained body condition and calves met average daily gain goals while grazing cover crops and crop residue.
  - Utilizing cover crops as forage allowed the Schmidts to feed less hay than previous years, while also increasing their herd size.
  - Graziers should consider entering into cost-share agreements with row crop neighbors to reduce cover crop establishment costs.

**Project Timeline:**  
September 2014 – May 2015



Cattle received 46% of their winter feed needs from grazing cover crops and crop residue Nov. 7, 2014 - March 3, 2015.



January 31, 2015 marked the start of the regular hay feeding season. Cattle grazed cover crops and crop residue for three months prior.

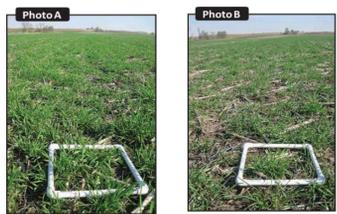


Photo A. Spring regrowth of rye in a field ungrazed by cattle. Pictured is 432 lb/ac rye growth. Photo taken April 17, 2015, prior to termination.

Photo B. Spring regrowth of rye in a field grazed the prior fall and winter. Pictured is 288 lb/ac rye growth. Cattle did not graze after March 3, 2015 due to wet, muddy conditions and the need to leave enough biomass to terminate properly. Photo taken April 17, 2015, prior to termination.

2014 cover crop seed and cost records.		
2014	Corn ground	Soybean ground
Cover crops seeded	Cereal rye, wheat, hairy vetch	Cereal rye, wheat, hairy vetch
Seeding rate (lb/ac)	85	85
Seed cost (\$/bu)	\$10.00	\$10.00
Seeding date	9/25/2014	9/25/2014
Aerial seeding cost (\$/ac)	\$21.00	\$21.00
Total seeding cost (\$/ac)	\$36.00	\$36.00
Acres seeded (ac)	100	85
Total cost (\$)	\$3,600	\$3,060
<b>Grand total (\$)</b>		<b>\$6,660</b>

Mean monthly temperature and total monthly rainfall and snow for 2014-2015 and long-term average**.				
Month	Temperature (°F)	Rainfall/Snow (in)	2014-2015	Avg.
Sep '14	61	63	7.9	3.43
Oct	51	52	2.3	2.44
Nov	29	37	0.2 + 2.0 snow	1.59
Dec	28	24	0.8	1.04
Jan '15	22	19	0.1 + 10.0 snow	0.85
Feb	14	24	3.0 snow	1.00
Mar	37	36	0.1	2.09
Apr	49	49	4.2	3.44
May	58	61	7.3	4.43
Jun	70	70	10.6	4.87
Jul	73	74	6.1	4.03
Aug	70	72	5.5	4.17

\* Mean monthly temperature for 2014 and 2015 and the long-term temperature and rainfall averages at the Audubon (60 years approx. 15 mi. from Schmidt's weather station (Iowa Environmental Mesonet, 2015).  
\*\* Total monthly rainfall and snow for 2014-2015 at the Schmidts' farm (measured by Dave).

The 11.5 inches of rain in April and May 2015 prevented cattle from spring grazing cover crops. The rain also delayed the grazing of perennial pasture, increasing 2015 hay costs.

2014-2015 monthly animal feed requirements and feed consumption.			
	Animal Requirements (tons of DM)	Hay Consumed (tons of DM)	Cover Crop and Crop Residue Consumed (tons of DM)
Nov '14	14.5	0.0	14.5
Dec	14.5	0.9	13.6
Jan '15	14.4	3.7	10.7
Feb	13.2	12.4	0.8
Mar	15.1	12.7	0
Apr	14.7	15.1	0
<b>Total</b>	<b>95.7</b>	<b>40.8</b>	<b>54.9</b>

Across the 2014-2015 winter feeding season (November to April), 46% of the animals' needs were met by cover crops and crop residues. Nearly all of the animals' requirements were met by the cover crops and crop residues in November and December, and 74% of animal needs were met by cover crops and grazing in January.

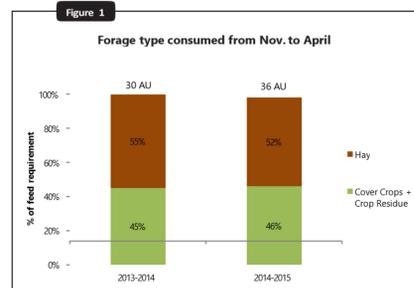


Figure 1. Forage type consumed from Nov. to April each year. In March 2015, animals should have been offered two tons more hay, which is why only 98% of their feed requirements were met in 2014-2015. However, cattle maintained a body condition score of >5 the entire year and met calving goals the following spring.

Figure 1 shows animal feed requirement comparisons between the last two winter seasons. The Schmidts increased their herd by 6 AU (6,000 lb) in 2014-2015. Despite adding more animals and planting 40 fewer acres of cover crops than the previous year, the herd met their nutritional requirements with a lesser percentage of hay than in 2013-2014. This implies the herd is receiving more from the cover crop – which is attributed to better grazing management. Instead of letting the herd have access to the entire field, Dave and Meg split it into two paddocks. Dave stated, "Splitting the crop ground allowed us to ration out crop residue and gave the rye a chance to grow longer."

The practice of grazing cover crops on crop ground also provides a nearly complete ration. The high protein, highly digestible forage complements the low protein, lower digestible crop residue as the primary energy source (Vough, 2015). Grazing high protein cover crops stimulates the utilization of available corn and soybean residue. Meg believes, "Cover crops are equivalent to a protein lick tub – plus, you don't have to drag it to the field, the soil benefits from the cover crop and there are less compaction issues from where a tub would sit."

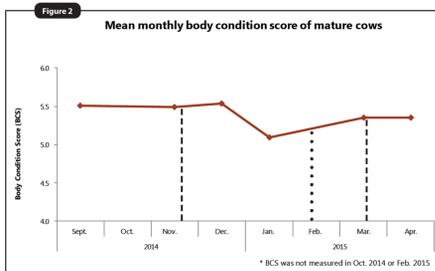


Figure 2. Mean monthly body condition score of mature cows. The dashed vertical lines represent when cattle were turned into the crop field with cover crops (Nov. 7) and when they were taken out (Mar. 3). The dotted vertical line represents the date when hay started to be fed on a regular basis (Jan 31).

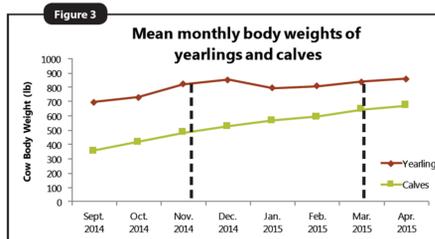


Figure 3. Mean monthly body weights of yearlings and calves. The dashed vertical lines represent when cattle were turned into the crop field with cover crops (Nov. 7) and when they were taken out (Mar. 3).

## Economics

The Schmidts essentially offset three months of feeding hay by grazing cover crops and crop residue. The feed, equipment and labor costs for winter grazing and hay feeding were calculated. This cost was then compared to the cost of feeding 100% hay with no grazing. Also, the Schmidts benefited from cover crop cost-share, and these savings are included for additional comparison.

Cost comparisons for winter 2014-2015 feeding scenarios.			
	Graze + Hay	100% Hay	Graze + Hay + Cost-Share
Winter feed costs total	\$14,014	\$14,495	\$10,129
Winter feed costs per AUD	\$2.24	\$2.31	\$1.62

Comparison of hay consumption and costs across four winter feeding seasons.				
Winter feeding season (days)	2011-2012	2012-2013	2013-2014	2014-2015
Winter feeding season (days)	134	140	90	90
Animal units (AU)	19	23	30	36
Total hay consumed (tons)	28	50	48	49
Market value of hay (\$)	\$3,700	\$7,000	\$6,700	\$6,370

Comparison of hay consumption and hay costs over the last four winters at the Schmidts' farm. Their feed costs have increased by less than \$3,000 compared to four years ago, despite them feeding 17,000 more pounds of cattle (17 AU). They have accomplished this by being able to feed a lesser percentage of hay to their herd each winter.

Over the four years the Schmidts have tracked winter feed intake, they have increased their herd size from 19 AU to 36 AU and have been able to successfully offset the amount of hay fed by extending their grazing season through cover crops. Conducting this on-farm research helped Dave to see "year four numbers were similar to previous years which confirms accuracy and tells me that we're saving money by grazing cover crops."

When asked his future plans Dave said, "I plan to go out of my way to keep grazing cover crops on row crop land and continue to establish relationships with neighboring row crop farmers." Dave hopes his research results help convince other farmers that cover crops can provide high-quality off-season feed while benefiting the soil.

## 100% Hay:

From Nov. to April, the herd required 86.5 tons of DM, which equates to about 102 tons of hay. The time period between coming off fall pasture and being turned out onto spring pasture was 174 days. If bales were fed every other day, this equates to 87 bale feeding events:

- 102 tons of hay required x \$130/tn = \$13,260 hay expense
- Fuel: 26 hrs x 5 gal/hr x 3.50/gal = \$455
- Labor: 52 hrs x \$15/hr = \$780
- \$13,260 (hay) + \$1,235 (fuel & labor) = \$14,495 total winter feed expenses**

On an animal unit per day basis: \$14,495 (total expenses)/174 days/36 AU = **\$2.31/AUD**

- \$14,464 (100% hay) - \$14,014 (graze + hay) = **\$481 saved** when grazing and feeding hay

Grazing cover crops and feeding hay over the winter saved the Schmidts \$481 over feeding 100% hay. This value does not incorporate the forage quality value of the cover crop or the soil health benefits from the cover crop. Dave stated, "A grazer could afford to contribute the \$480 dollars saved on hay expenses towards the establishment of cover crops to graze." These calculations show that by keeping cattle on the land during the winter reduces equipment and labor costs while reducing the hay bill.

## Graze + Hay:

Dave and Meg make some of their own hay and purchase the rest. The hay they purchased cost them on average \$74/ton; less than the market value of hay in January 2015, which was \$130/ton (USDA, 2015).

Dave and Meg regularly fed hay from Jan. 31 to April 30; on average feeding one large round bale every other day for 90 days. During this time period, they incurred 46 bale feeding events (at times feeding multiple bales) which equated to 49 tons of hay.

When applying the market value to the home-raised and purchased hay, the value of 49 tons of home-raised and purchased hay combined is \$6,370. Setting bales out for cattle took about 15-30 minutes of tractor time and twice as much human time. 46 bale feeding events required 14 equipment hours and about 28 human hours. From a previous PFI Cooperators' Program research report on grazing cover crops for winter feed the Schmidts were involved in (Dunn et al., 2014), consider the following cost estimates:

- Fuel cost: 14 hrs x 5 gal/hr x \$3.50/gal = \$245
- Labor cost: 28 hrs x \$15/hr = \$420
- Total = \$665
- \$6,370 (total market value of hay) + \$665 (fuel & labor) = **\$7,035 total hay expenses**

When cows were grazing on cover crops and crop residue, it took about 15 min to check cows on days they were out grazing. Cattle grazed, and were supplemented very little hay from Nov. 7 – Jan. 31; for 85 days.

Cover crop establishment costs were \$6,660.

- Labor cost: 0.25 hr/d x \$15/hr x 85 d = \$319
- \$6,660 (cost of cover crops) + \$319 (labor) = \$6,979 total grazing expenses
- Totaling hay + grazing expenses together: \$7,035 (hay expenses) + \$6,979 (grazing expenses) = **\$14,014 total winter feed expenses**
- On an animal unit per day basis: \$14,014 (total expenses)/174 days total/36 AU = **\$2.24/AUD**

## Graze + Hay + Cost-Share:

Keep in mind that the above estimates do not include any cover crop cost-share benefits. Dave and Meg worked out a deal with Richard where they pay for seed and Richard pays for aerial application. Incorporating this cost savings breaks down as follows:

- \$6,660 (establishment of cover crops) - \$3,885 (cost of aerial application) + \$319 (labor) = \$3,094
- \$3,094 total cost of grazing expenses
- Totaling hay + grazing expenses together: \$7,035 (hay expenses) + \$3,094 (grazing expenses) = **\$10,129 total winter feed expenses**
- On an animal unit per day basis: \$10,129 (total expenses)/174 days/36 AU = **\$1.62/AUD**
- \$14,495 (100% hay) - \$10,129 (hay + graze + cost share) = **\$4,366 saved** when incorporating cost-share.

This estimate encourages graziers to enroll in cost-share programs or work out agreements with landowners and row crops farmers to split cover crop establishment costs.

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