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Livestock Research

Grazing Cover Crops for Winter Feed 2014

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Cooperators:

- **Dave and Meg Schmidt – Exira**

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In a Nutshell

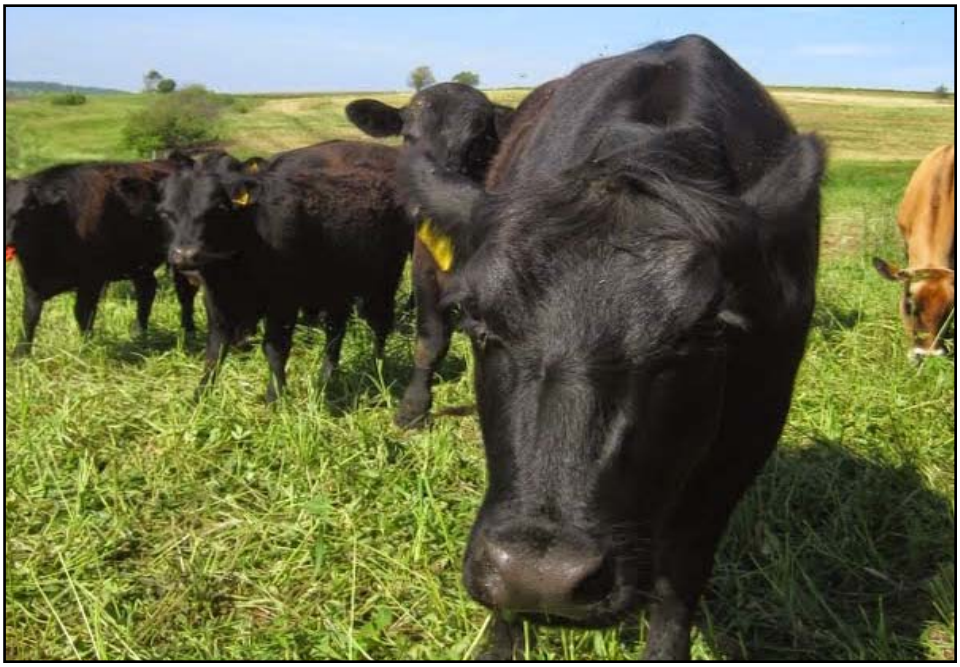
- Feeding cows during the winter is often expensive, requiring investment in stored feeds like hay and extra labor from the producer.
- In addition to the numerous benefits of cover crops for row crop farmers, livestock can graze the forage, providing a high-quality and low-cost feed during times of low feed supplies.
- Dave and Meg Schmidt planted cover crops and grazed crop residues to reduce expenses and keep their animals out on pasture.
- Over three winter seasons, they have maintained animal performance and are starting to see reduced winter feed costs.

Key findings:

- Planting cover crops and utilizing crop residue in the late fall has delayed the onset of regular hay feeding.
- Calf average daily gain over the winter has improved over the years, implying better nutrition, management, and genetics.
- Feeding hay can be successfully offset by cover crops and crop residues.

Project Timeline:

September 2013 - April 2014



With rotational grazing and cover crops, the Schmidts hope to extend their grazing season

Background

The single greatest cost of maintaining forage-based cattle over winter is the purchase of stored feeds. Managing livestock on grass reduces feeding expenses associated with harvest, storage, and transport. Rather than the farmer cutting, raking, baling, and storing hay for animals in lots, the animals do the harvesting themselves. Stockpiling some pastures for winter grazing is part of developing a year-long grazing system; beef cattle can remain healthy and productive when grazing properly-stockpiled forage. Still, situations arise where feeding stored hay or other feeds is necessary. The droughty summers of the past few years have reduced pasture productivity, making stockpiling difficult, and requiring graziers to either make or purchase hay for winter use. Stored feed is the single largest expense on cow-calf operations. Practical Farmers members developed a project to track the hay requirements of beef cattle during the winter. Over the past three winters, Dave and Meg Schmidt have tried different pasture management techniques and monitored feed consumption as well as animal performance, to try to reduce these expenses.

Materials and Methods

Dave and Meg worked with Meg's father to seed around 220 ac of cropground with cover crops in the fall of 2013. Cover crops were seeded in September into standing corn and soybeans (at dry-down in corn and yellow leaves in beans). On corn ground, homegrown winter rye, winter wheat, and hairy vetch were aerially seeded at about 84 lb/ac on Sept 2. Two weeks later, purchased VNS winter rye was flown into soybeans at about 86 lb/ac. Very little hairy vetch germinated, so the following results are for the rye and wheat only.

Cattle grazed about 220 ac of cornstalks, bean stubble, and the cover crops from late October through early March, a total of 140 days. Hay was fed regularly starting February 1. After that they were moved to a home lot for hay feeding for another 54 days (total of 90 days of hay feeding). Because of the wet, muddy spring, they did not graze regrowth on the crop acres; Dave and Meg didn't want to tear up the soil and wanted to leave enough leaf area for herbicide to properly kill the cover crops.

Dave and Meg recorded the movement of animals through different lots and pastures, tracked weight and body condition scores (1-9 scale, 1 = emaciated and 9 = obese), and noted the amount and value of feed consumed. Monitoring began when animals finished the normal summer (growing season) grazing and moved to winter fields or lots – roughly late October through the end of April.

Results

Cow and calf weight and condition

Body condition scoring, which assigns scores to animals based on visual evidence of fat cover, was done at least monthly on mature cows. Ideally, on a 1-9 scale, cow body condition scores should stay between 4 and 6. Dropping below four puts cows at a risk of low milk production and delayed rebreeding during the following lactation and breeding season. Scores above six are not bad for the animal so much as suggesting that the farmer is wasting money keeping the cow that fat. Despite a long and cold winter, animal condition remained adequate. **Figure 1** shows the mean body condition scores of mature animals in Dave and Meg's herd. Scores were all within the target range. Two-year-old cows' scores were greater than older cows' scores, likely because the older animals were still regaining weight and condition following calving and lactation the previous spring and summer.

Dave and Meg weighed animals about once a month; less often for mature cows (whose weight will vary with pregnancy but not growth). **Figure 2** shows the mean body weights of animals in the herd. As is hoped, weight of growing animals (youngstock and two-year-olds) increased over time. Mature cow body weights did not vary much, also as expected; as the bred cows get further along in gestation (April, May 2014) their weights would be expected to rise.

Over the entire period – October through May – the two-year-old cows gained an average of 1.9 lb/d, and younger animals an average of 1.4 lb/d. This is a 22% increase over the young animal ADG from the previous winter season – not too shabby considering how cold it was!

Figure 1

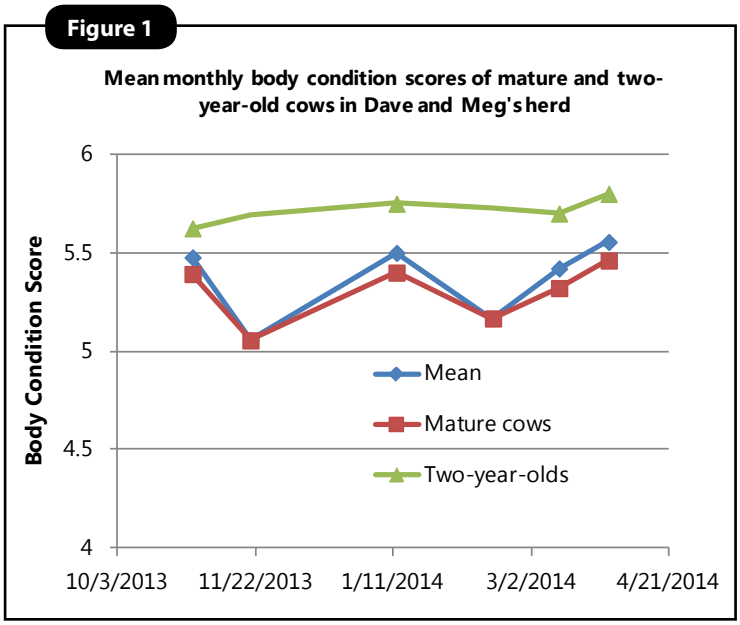
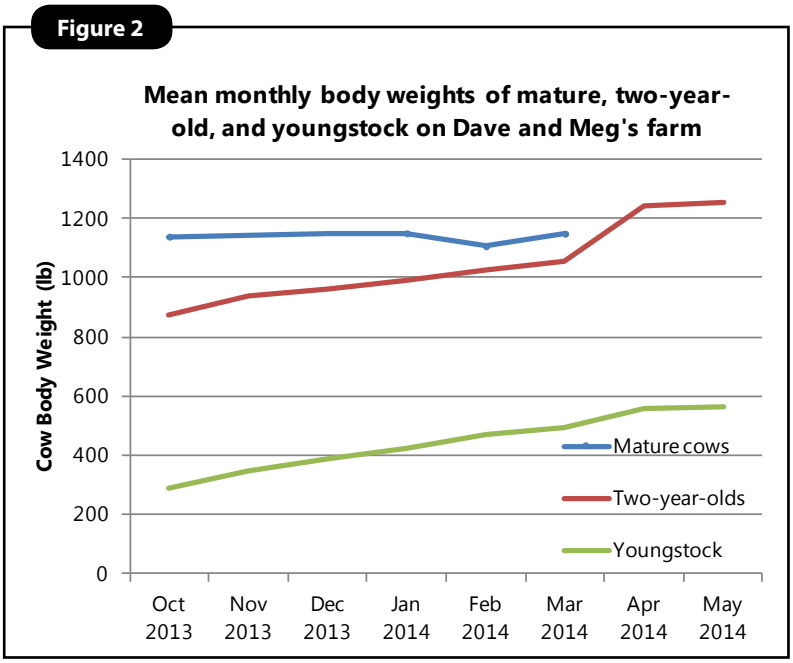


Figure 2



Cattle Movement and Feeds

Dave and Meg moved their cattle from summer pastures to winter rye cover crop acres in late October. They were limited to a 23-ac field at first, to allow more cover crop growth on the rest of the area. Starting in early November, the animals had access to over 200 acres of cornstalks and cover crops, and they remained there through early March, a total of about 140 days. They then returned to the home farm and were fed hay in a lot until early May, when they began a new season of grazing.

"We fed several bales in December due to cold but didn't start regular hay feeding until Feb 1st," Dave reported. Hay was regularly fed for about 90 days (early February through the end of April). Compared to previous years, regular hay feeding started slightly later but ended around the same time, suggesting better quantity and quality of cover crops and cornstalks, and greater availability of pasture later in the grazing season.

Feed consumption

Tracking the amount of feed consumed and when confirms that Dave and Meg's cattle obtained more of their nutrition from grazed forages than from hay (**Table 1**). Animal requirements are based on animal unit days (AUD), a standardized expected daily intake of 26 lb of forage dry matter (DM) per 1000-lb animal unit (AU). Over the entire season, Dave and

Meg had about 30 AU grazing, requiring 4200 AUD. The table shows the amount of DM required to feed the animals in a given month: (number of AU fed) x 26 lb/AUD x (days in the month). The amount of hay fed in that month, based on Dave's records, is in the second column, adjusted to a DM basis assuming 85% DM. The third column is the how much cover crop or crop residue DM consumed, estimated as the difference between the animals' requirements and what was fed as hay.

For instance, in September, the animals required about 11.0 tons of DM: 28.2 AU x 26 lb/AUD x 30 d = 21,996 lb DM = 11.0 tons DM. Dave and Meg fed about 0.5 ton hay, so the remaining 10.5 tons of the animals' needs were filled by cover crops or crop residues. In March, the negative value of cover crops or crop residues indicates that more hay was fed than the animals required.

The 40.8 tons of hay DM is equivalent to 48.0 tons as-fed, assuming 85% DM.

Across the entire 2013-2014 winter feeding season, 57% of the animals' needs were met by cover crops or crop residues; much more than the 48% in 2011-2012 and 11.5% in 2012-2013. During the winter of 2012-2013, animals were unable to graze stockpiled forages or cover crops, which contributed to the greater use of hay.

Table 1

Monthly animal feed requirements and feed consumption on Dave and Meg's Farm

	Animal requirements (tons of DM)	Hay consumed (tons of DM)	Cover crops or crop residues consumed (tons of DM)
Sept 2013	11.0	0.5	10.5
Oct 2013	11.2	0.0	11.2
Nov 2013	11.4	0.2	11.2
Dec 2013	12.1	2.0	10.1
Jan 2014	12.4	4.1	8.2
Feb 2014	11.3	8.6	2.7
Mar 2014	12.9	13.0	-0.1
Apr 2014	13.4	12.4	1.0
Total	**95.7**	**40.8**	**54.9**

Table 2

Cover crop seeding records from Troublesome Creek Cattle Co

	Corn ground	Soybean ground
Species seeded	rye, wheat, hairy vetch	rye
Seeding rate (lb/ac)	84	86
Seed cost ($/lb)	9.00	12.00
Seeding date	9/2/2013	9/16/2013
Aerial seeding cost ($/ac)	20.50	20.50
Total seeding cost ($/ac)	34.00	39.00
Acres seeded (ac)	110	110
Total cost ($)	3740	4290
Grand total ($)	**8030**	

Feed costs/value

Using some values from the Iowa State University Ag Decision Maker spreadsheets, Dave and Meg estimated that the homegrown cover crops they seeded cost about $9/bu. The rye they purchased was $12/bu. **Table 2** shows a rough cost breakdown.

Dave and Meg did not purchase all of their hay – some was grown and harvested on the home farm. Using values from the Iowa State University Ag Decision Maker, the cost of raising hay at the home farm was approximately $30/ton of forage when taking into account fuel and field operations. The hay that they did purchase cost $140/ton, which was the January 2014 hay price throughout Iowa. Altogether, the combined cost of raising hay on the farm and purchasing hay came out to about $4,700. This is far below the roughly $5500 spent on hay in 2011-2012 and 2012-2013.

While the total amount spent on hay was lowest this most recent winter, it is important to consider that prices fluctuate between seasons and that not all hay used was purchased from off the farm. January 2014 hay prices were at about $140/ton, not dissimilar to prices from the past two winters ($130 and $140 in 2011-2012 and 2012-2013, respectively). When applying the market value to the home-raised hay, the value of the home-raised and purchased hay combined is about $6700.

One of the best comparisons of how much was spent on feeding hay in the winter also takes into account the number of animals. Dave and Meg have increased their herd size each year on the trial. As shown in **Table 3**, their feed costs per AU are not much greater than when they first began tracking in 2011-2012.

Table 3

Comparison of hay consumption and costs across three winter feeding seasons on Dave and Meg's farm

	2011-2012	2012-2013	2013-2014
Regular winter feeding season (days)	134	140	90
Animal units (AU)	19	23	30
Total hay consumed (tons)	28.3	50.4	48.0
Market value of hay ($)	3700	7000	6700

Labor

Feeding cattle, whether by moving and unrolling hay bales or by moving grazing animals in the field, requires time. Dave and Meg provided estimates of the time it took them to manage their animals over the winter.

Setting bales out for the cattle took about 15-30 minutes of tractor or skid loader time and about twice as much human time. Iowa State's Ag Decision Maker software provides a quick estimate of tractor fuel usage at 5 gal/hr, and here it is assumed that diesel is about $3.75/gal. About 50 bale-feeding events took place, requiring about 15 equipment hours and about 30 human hours.

- Fuel cost: 15 hr x 5 gal/hr x $3.75/gal = $281.25
- Labor cost: 30 hr x $15/hr = $450
- Total: $731.25, so roughly $730
- Cattle were fed for 90 days, so: $730 / 90 d = $8.11/d

When cows were grazing on crop residue and cover crops, it took about 15 min to check cows on days they were not given hay, and occasionally ice had to be cleared out of waterers or streams, requiring 20-30 min. Averaging this out to about 15 min daily:

- Labor cost: 0.25 hr/d x $15/hr x 140 d = $525
- Cattle were grazed for 140 days, so: $525 / 140 d = $3.75/d

90 days of hay feeding incurred about $200 more expense than 140 days of grazing. Reducing the use of equipment by keeping cattle on crop residues and cover crops during the winter greatly reduces equipment and labor costs.

Using that as the value of the grazed cropground and incorporating the costs of the stored feeds into the above values, the final breakdown is as follows:

- Hay: $6700 (market price of feed) + $730 (labor/fuel) = $7430 total, or $83/d, or $248/AU, or $2.75/AUD
- Grazing: $8030 (establishment of cover crops) + $525 (labor) = $8555 total, or $61/d, or $285/AU, or $2.04/AUD

Clearly, extending the grazing season through cover crops and crop residues saves money for producers. Grazing cost about $0.70 less per AUD than feeding hay, an incredible savings when extended to an entire herd over the winter. In addition, this estimate implies that Dave and Meg paid for all of the cover crop expenses, which was not and is often not the case. Many crop and livestock farmers partner to improve soil health and ease tight feed supplies; Meg's father owns the cropground and paid for the cover crops because of the soil benefits. Taking out the cover crop establishment costs, only the labor cost would be Dave and Meg's responsibility – further reducing the cost to $0.13/AUD!

Conclusion

Dave and Meg will continue to experiment with ways to extend their grazing season through cover cropping, stockpiled forages, and utilizing crop residues in order to further reduce their costs while raising high-quality grassfed cattle. Their feeding plan maintains cow body condition throughout the winter and promotes weight gain of young cows and calves. They hope to learn what works now so they can be efficient producers as their herd grows. They have considered working with branded beef companies and are looking at how to align their production practices with the requirements of the programs. Dave said recently, "*I believe we can greatly improve our operation by further reducing our use of hay. Our long-term goal is to cut stored feeds down to approximately one month when gestating cows have high nutritional needs or when the weather is extremely harsh. We intend to achieve that goal by continuing to improve the genetics of our cattle herd, increasing the duration of perennial pasture productivity into the fall, strategically utilizing stockpiled pastures, and maintaining our use of crop residues and fall-seeded cover crops.*" They have already proven that utilizing crop residues and cover crops reduces feed, fuel, and labor costs compared to feeding hay.

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