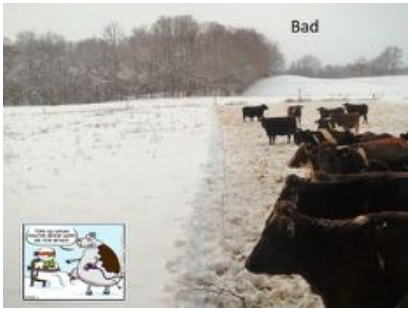
The last speaker of Session 4 was **Troy Bishopp**, Regional Grazing Specialist (East) at Upper Susquehanna Coalition, Horseheads, NY. The title of his presentation was "My Quest for Winter Grazing: The Good, The Bad, and the Ugly".

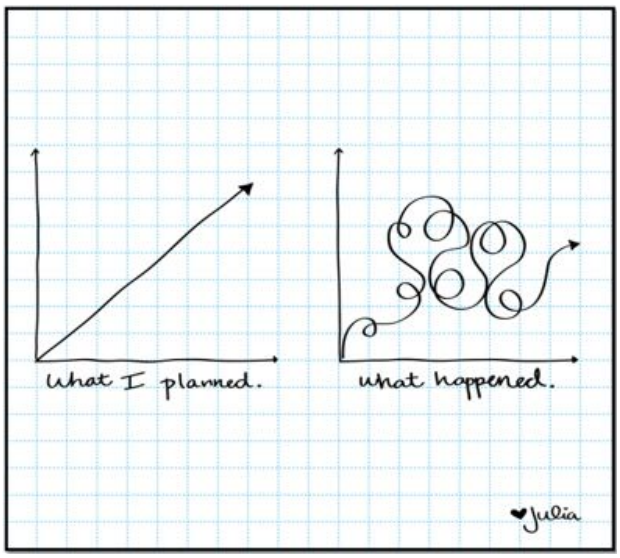


Troy began his presentation showing what he meant about the good, bad, and ugly concerning winter grazing. The photo to the left above shows plenty of grazable forage under a light coating of snow. Livestock can deal easily with that amount of snow and graze away. The center photo is a deeper snow depth that could be under a glaze of ice. Not impossible for grazing to occur if powder snow, but it involves a lot more grazing effort and more wasted forage from trampling and soiling trying to graze in the snow. The photo to the right shows very severe pugging of the soil near the edge of a winter pasture. The hedgerow/wood's edge at the left edge of the field made a good windbreak so cattle malingered there. If it also caused snow to drift and it melted that would have caused this part of the field to be much wetter than the rest and the ground perhaps only partially frozen. It turned into a quagmire. It is now a sacrifice lot even if not planned to be one.

Troy also remarked that he used the word "quest" in the presentation title, because winter grazing to extend the grazing season is just that "a quest". It can be planned for, but there many unforeseen events that make it not a given. He has had 35 years of grazing experience, but there are still trial and error situations that arise. A 180-day pasture program is what he now shoots for as a minimum. Anything he can get beyond that in extra days on pasture is a win. With his operation of contract grazing dairy heifers and finishing beef on pasture, there is a need to think and plan ahead to avoid major train wrecks. These two cattle types need dairy milk cow quality grazable forage.

He also started out with a clever "disclaimer" statement. "Farmer tested grazing management ideas, experiences, and implementation on a specific land base using educated animals and specific goals. These findings are based on practical science, observation, and hunches. Results may vary depending on a multitude of factors and land management goals which the presenter cannot be held accountable for. Proceed on your own farm with passion, deep thinking, small in-field trials, and further knowledge to substantiate such claims."

Winter grazing is challenging. What you plan to do and what you end up doing can be two completely different things. This is shown in the next figure.



It seldom turns out to be a straight line to the goal of maximizing the intake of winter standing forage. It is more like a snaky piece of fencing wire. It can be a convoluted mess to solve on how to unravel it and harvest all that forage with a grazing animal. Perhaps falling short of how far into the winter it was feasible to really get to before resorting to feeding stored feed until spring that may or may not start on your time line. Conditions for winter grazing can change overnight as shown in the two photos below, from pleasant to downright nasty. One day lots of grazable forage just waiting to be grazed, and the next day buried under snow.

Troy recommended a book by Jim Gerrish called “Kick the Hay Habit, A Practical Guide to Year-Around Grazing”. He quoted Jim as saying, “Winter feed costs are the single largest cost in most livestock operations”.

The alternatives to extending the season by only stockpiling pasture should be penciled out too!

- Haymaking?
- Hay Once, Graze once in the 60-day late summer – fall growing window
- Plant an annual on cropland for grazing? (sorghum, brassicas, cover crop)
- Increase stocking rate during the grazing season and forget extending the grazing season
- Graze twice in the 60-day window
- Limit stockpile consumption and feed some to stretch it
- Rent other land?
- Graze after-feed on another farm
- Others to extend your season??????????????

Issues Troy thinks about:
Financial and environmental questions

- The idea of stocking for extended grazing when you are tasked to keep the same number of animals.
- As a contract grazier, he provides extended grazing into winter replacing hay, why can't I ask for more money? $1.20/day versus 2.60/day
- Inter-seeding perennial pastures is not a cost-effective way to increase tonnage.
- Climate Change and the "Perpetual November"
- Wrong pasture species composition, resistance to change with a heavy fescue sward
- How low do you go (grazing height of stubble)?
- Right sizing, Right animal
- What is the best strategy? All grass, or grass with supplementation?
- Sacrifice area, barns, heavy use areas, shelter-breaks, woods
- Are you ready when a storm hits? How much will you force the animals to graze?
- Cost of refitting land in the spring that was badly pugged, and
- Melting grass (losses of dry matter [DM] during winter grazing season)

Troy expounded more on "Perpetual November". Winters are becoming more open, wetter, and warmer so that December and January can be similar to November and even late winter can be mild. It also means a perpetual mud season off and on if mild enough so that the ground does not freeze for very long and thaws, and rains come instead of snow. A series of photos will show how one season varied from day to day.

He reiterated that you must keep monitoring and measuring and thinking. As an example of monitoring and measuring, he gave us an example using one of his farm's paddocks:
Field 2 1acre
8 inches of grass height x 300lbs. DM per inch (based on stand density or clipped & weighed sample)= 2400lbs. DM (1.2 tons)
Last Grazed August 17th

Do some basic mathematics to come up with amount of dry matter available. Since it is measured from the ground surface to the top of the grass canopy, allow for at least a 3-inch stubble height left after grazing. 1500 pounds per acre of forage is actually available to feed the livestock (5/8 X 2400). Use a realistic daily intake in DM per head for the size and class of livestock to be grazing it to see how many head this paddock can support for one day before being moved to a fresh paddock. Is the paddock big enough for the herd size to be on it one day, or do they have to be moved sooner, or later? This involves the thinking part of the equation.

Troy begins stockpiling forage at by mid-August. At mid-October, he begins rationing out the stockpiled forage. Here is his technique for figuring how many days he can have his cattle grazing stockpiled forage:

EXAMPLE So here is his figuring . . .

53 Dairy Heifers, 4 bulls and 2 cow/calf pairs start grazing stockpile on October 15th.

53 head @ 850lbs, 4 bulls @ 1200lbs, 2 pairs @ 3400lbs. Eating 3.5% DM of their Bodyweight

53 x 30lbs/day = 1590lbs. 4 x 42lbs./day = 168lbs 2 x 60lbs./day = 120lbs.

TOTAL Dry Matter (Dry feed) needed per day = 1878 pounds for the herd or 2 ½ round bales/day

What does he have in pasture inventory??

20 fields conservatively yielded 267,800 pounds of Dry Matter (133.9 tons) *(if you grazed it at 100% leaving nothing)
267,800 pounds Divided by 1878 pounds needed per day = 142 days of feed hypothetically

@ 80% efficiency - 214,240lbs.DM ÷ 1878/day = 114 days of feed
@ 60% efficiency - 160,680lbs. DM ÷ 1878/day = 85 days of feed
@ 50% efficiency - 133,900lbs.DM ÷ 1878/day = 71 days of feed

Actual: 75 days of feed.

In this example, the stockpiled forage is gone by the end of December unless lucky enough to get some warm weather to get enough growth for a second grazing on some of the first grazed paddocks. Or, the estimate on intake is a bit high, or there was more forage than first estimated. The estimate of 50% grazing efficiency estimate is really close to the actual. The bottom of the forage sward always weighs more than the grass stand higher up, but then it is the stem bases that hold most of the carbohydrate reserves for grasses such as orchardgrass and fescue, not the roots. The reason for not going below a 3-inch stubble height with those two grasses whether it is grazed or mowed.

Troy documented the 2014 season of grazing stockpiled forage to illustrate how it goes: the good, the bad, and the ugly. Very good weather held from mid-October until mid-November before light snow occurred on November 14th. The left picture below shows the herd grazing

grass on November 14th in freshly fallen snow. Clear skies and cold on November 15th, but herd contentedly grazing grass through the snow. Then, two more snow storms occurred on November 17th-18th and November 21st.

By November 23rd, the snow was almost totally melted. It was good open grazing until November 27th before another snow storm came in. By November 30th, most of the snow was gone and completely gone by December 1st. Stockpiled pastures enjoyed a week of being snow-free before a 3-day snow storm hit on December 9, 10, and 11. This was a heavy snow. Some hay was hauled in to supplement stockpiled forage that had become harder to get to. Note picture to the left, front-end loader of tractor bringing in the hay.

This snow lingered for several days, not melting away until December 24th. The weather held well the rest of December. Hay continued to be fed to supplement stockpile pasture until January 2nd, when full hay feeding commenced after a 257-day grazing season in paddocks 7 & 8.

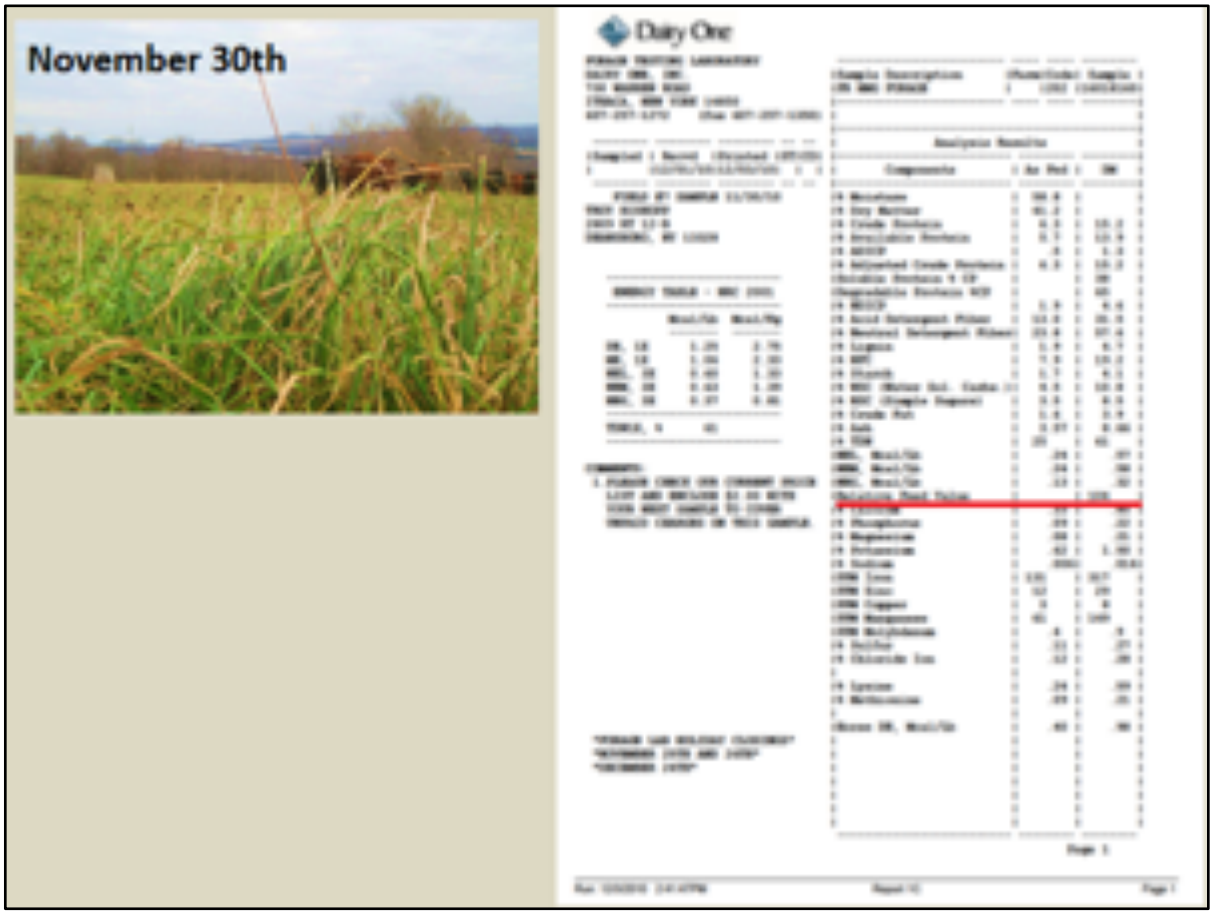
Stockpiled pasture without a coating of snow after 10 days

Hay being rolled out on pasture on January 2nd.

Relative feed value (RFV) was focused on in some forage samples taken at different times during the stockpile grazing period. The earliest test shown was on November 1st. Another forage sample was taken on November 30. Both of these test results were accompanied with a picture of the grass in the paddock the forage samples were taken from. The two are pictured immediately below:

Components	As Fed	DM
% Moisture	68.9	
% Dry Matter	31.1	
% Crude Protein	6.3	16.0
% Adjusted Crude Protein	6.3	16.0
% Acid Detergent Fiber	11.1	35.7
% Neutral Detergent Fiber	17.1	54.8
% NFC	6.6	20.5
% TDN	19	62
NEL, Mcal/lb	.18	.59
NEM, Mcal/lb	.18	.59
NEG, Mcal/lb	.10	.33
Relative Feed Value		104
Horse DE, Mcal/lb	.32	1.02

Relative Feed Value underlined in red in Nov. 1st forage analysis results for paddock 12



Relative Feed Value underlined in red in Nov. 30th forage analysis results for paddock 7

RFV for both of these paddocks composed of orchardgrass and ladino clover was 104. (Editor's Notes: Full bloom alfalfa (41% ADF and 53% NDF) is estimated to have an RFV of 100. Full bloom alfalfa is past its prime. If a forage has an RFV value greater than 100, it should result in greater intake of digestible dry matter by the cow than full bloom alfalfa [Ward & de Ondarza, 2008]. RFV is intended to reflect how well an animal will eat and digest a particular forage if it is fed as the only source of energy. Relative Feed Value is calculated from ADF and NDF content of a forage. Dry matter intake (DMI) as a percentage of animal body weight is predicted based on the analyzed NDF content of the forage. Digestible dry matter (DDM) (%DM) is predicted from the analyzed ADF content of the forage. These two estimates are multiplied together and divided by the constant, 1.29, to come up with RFV [Ward & de Ondarza, 2008].)

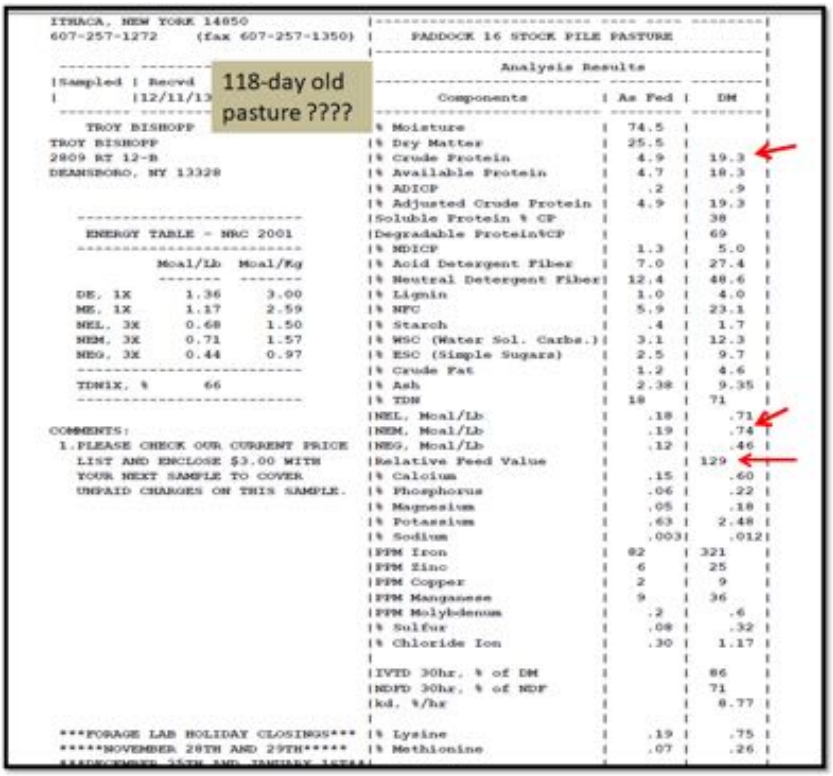
RFV is calculated as follows:
RFV = (DMI, % of body weight) * (DDM, % of DM) / 1.29
Where: DMI = dry matter intake (% of body weight) = 120 / (NDF, %DM)
Example from Nov. 1st forage analysis results DMI = 120/54.8 = 2.19%
DDM = digestible dry matter = 88.9 – (0.779 x ADF, %DM)

(Editor's Notes: RFV does not consider fiber digestibility. It therefore discriminates against forages with highly digestible fiber. Haycrop forage containing grass is underrated by the RFV system because grass contains more NDF but that NDF is more digestible than it is in alfalfa [Ward & de Ondarza, 2008]. The DMI calculated for the November 1st forage sample was 2.19. This is considerably lower than the target DMI set by Troy of 3.5. True intake is somewhere in between. See RFQ in second paragraph below.

RFV of these two samples shown above is rather low due to the presence of yellow leaf in the standing forage. (See the photos of the forage above.) These leaves are senescing (dying) and as a result are more fibrous elevating the ADF and NDF values higher than an all-green forage would test. This is why in mid-summer it is better to graze grass within 42 days, or end up with reduced forage quality as older leaves turn yellow. Paddock sizes need to expand to meet demand.

Relative forage quality (RFQ) is a better measure of forage quality for grasses. RFQ is an estimate of how much available energy a non-lactating animal will obtain daily from a particular forage if it is all that is fed. Relative Forage Quality (RFQ) attempts to improve on RFV by using TDN (Total Digestible Nutrients) instead of DDM and calculating TDN and intake using in vitro fiber digestibility estimates. RFQ should therefore do a better job than RFV of describing the production potential of a forage [Ward & de Ondarza, 2008]. It consistently gives grass a higher forage quality value than does RFV. Lab analysis and calculating RFQ is more involved, but worth it.)

In a forage sample taken in December 2013 from paddock 16, the RFV value is higher (129). See analysis results below.



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TROY BISHOPP
TROY BISHOPP
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DEANSBORO, NY 13328

ENERGY TABLE - NRC 2001

	Mcal/lb	Mcal/Kg
DE, 1X	1.36	3.00
ME, 1X	1.17	2.59
NEL, 3X	0.68	1.50
NEM, 3X	0.71	1.57
NEG, 3X	0.44	0.97
TDN1X, %	66	

COMMENTS:
1.PLEASE CHECK OUR CURRENT PRICE LIST AND ENCLOSE $3.00 WITH YOUR NEXT SAMPLE TO COVER UNPAID CHARGES ON THIS SAMPLE.

FORAGE LAB HOLIDAY CLOSINGS
*****NOVEMBER 28TH AND 29TH*****

PADDOCK 16 STOCK PILE PASTURE

Analysis Results

Components	As Fed	DM
% Moisture	74.5	
% Dry Matter	25.5	
% Crude Protein	4.9	19.3
% Available Protein	4.7	18.3
% ADICP	.2	.9
% Adjusted Crude Protein	4.9	19.3
Soluble Protein % CP		38
Degradable Protein%CP		69
% NDICP	1.3	5.0
% Acid Detergent Fiber	7.0	27.4
% Neutral Detergent Fiber	12.4	48.6
% Lignin	1.0	4.0
% NFC	5.9	23.1
% Starch	.4	1.7
% WSC (Water Sol. Carbs.)	3.1	12.3
% ESC (Simple Sugars)	2.5	9.7
% Crude Fat	1.2	4.6
% Ash	2.38	9.35
% TDN	18	71
NEL, Mcal/Lb	.18	.71
NEM, Mcal/Lb	.19	.74
NEG, Mcal/Lb	.12	.46
Relative Feed Value		129
% Calcium	.15	.60
% Phosphorus	.06	.22
% Magnesium	.05	.18
% Potassium	.63	2.48
% Sodium	.003	.012
PPM Iron	82	321
PPM Zinc	6	25
PPM Copper	2	9
PPM Manganese	9	36
PPM Molybdenum	.2	.6
% Sulfur	.08	.32
% Chloride Ion	.30	1.17
IVTD 30hr, % of DM		86
NDFD 30hr, % of NDF		71
kd, %/hr		8.77
% Lysine	.19	.75
% Methionine	.07	.26

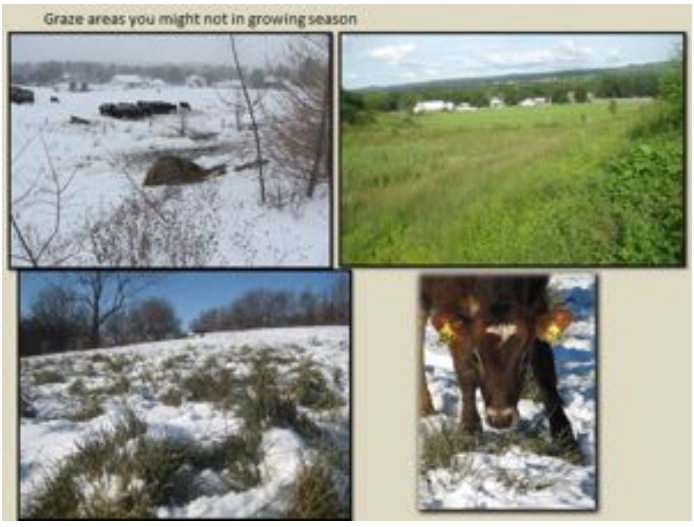
This is an outstanding forage test result for stockpiled forage. Protein content is 19.3 percent of forage DM and net energy of maintenance (NEM) is 0.74 Mcal per pound. Both ADF and NDF are below 30 & 50 percent of DM, respectively. Consequently, the RFV is higher than any of the stockpile forage samples taken earlier in 2014, including one taken during a pasture walk on December 6th that had RFV of 110. Troy asked the audience why the higher RFV test in December. Tom Griggs, WVU forage agronomist, offered that RFV was staying up because of

new grass growth boosting the quality of stockpiled forage in previously grazed stockpiled paddocks. Looking back at the photo of the person taking a grab sample of the forage in that paddock, there actually was more green leaf edible forage in the paddock albeit the presence of many dead weed stalks amid the grass. Amount of yellowed grass leaves was less than in the November photos. Tom's observation made good sense.

4-inch stubble height left after grazing a stockpiled pasture helps winter survival of stand and faster green-up in the spring. Soil is insulated some and traps snow for moisture.

Stockpiling will require advanced planning of grazing the paddocks next spring. By amassing forage growth in the fall for stockpiling, it will reduce tiller formation because of competition for light. This may also cause poor winter survival under hard winter conditions, and slow recovery next spring on heavily grazed pastures. Avoid this by leaving a 3-4 inch residual stubble. It is better to keep one or two pastures in reserve for early spring grazing to stagger the spring flush of grass and allow extra time for those late-fall grazed pastures to recover. Those pastures grazed latest into the fall before dormancy, will be slowest to recover in the spring. Winter grazing some paddocks thus can help stage paddocks to accumulate forage at different rates in the spring (WSU Extension on-line, 2020).

Troy also incorporates other areas of his farm into his winter grazing system. The two top pictures to the right show a riparian area that is too wet to graze in warm weather. It can be grazed in winter when the area is frozen. Rushes are eaten by cattle as shown in the lower two pictures. Rushes are high in minerals so they can help the cattle nutritionally. It is also better for turtles and other aquatic animals if the area is grazed in winter, he said.



He also mentioned that windbreaks are helpful for the grazing cattle to seek shelter from the wind when necessary. It also traps snow by creating drifts in pastures that will enhance soil moisture early in the next growing season.

Troy also elaborated on the melting grass bullet that he listed earlier in his presentation. As it gets colder, grasses like orchardgrass senesce (turn yellow) and if on the soil surface will start to rot and become worm food. Then, there are mice and deer that help deplete the forage base. (Editor's Note: Orchardgrass has a place as a stockpile forage, but forage researchers recommend that it be used early-on in the fall after a hard freeze and something like tall fescue (meadow fescue?) be used later as it will hold its quality much better even under snow cover.)

January 15th to April 15th is the weak link for Troy. It is two months that do not lend themselves to be a part of the grazing season. Options are:

- Send them off to another farm
- Crop residue grazing somewhere (fencing?)
- Swath graze (where? quality?)
- Overseed annuals or Brassicas that can overwinter and perhaps provide grazing earlier than April 15th.
- Work with crop farmers and cover crops
- Just feed hay and quit whining
- Suggestions ??????????????????????????

At the close of this session, there was a question about why cattle can sometimes bloat during early spring or late fall grazing. Jessica Williamson answered by saying she had been called out to a farm where half the herd had bloated. The veterinarian thought it was because a freeze had caused cell walls in the leaves to break releasing a lot of sugars. (Editor's Note: These sugars are easily fermented in the rumen which could cause a build-up of froth in the rumen. High quality forages such as young green cereal crops, rape, kale, turnips, and legumes such as peas that are grazable cover crops can induce frothy bloat as well. Rapid degradation of highly digestible plant matter will cause a sudden release of cell contents that are available for rumen microbes to digest. This sudden increase in nutrient availability causes microbial blooms, which in turn doubly increase rate of digestion. Soluble proteins and carbohydrates make up a large part of the cell contents, as do small particles which are actually parts of the plant cell walls these microbes attach themselves to. Any excess carbohydrates that microbes do not break down are stored as "slime" over their cellular bodies. This slime is highly viscous and very stable. Microbes also release a lot of gas with fermentation and digestion of these plant tissues. But with the additional buildup of slime, gas is trapped in these highly stable, slimy bubbles (froth). As rumen pressure increases, the more slime and gas is produced. The more pressure that builds up in the rumen, the more pressure is put on the lungs. If not treated promptly, the animal eventually dies of suffocation from not being able breathe [K. Lindquist, 2020].)