

# 2017 Northeast Pasture Consortium Annual Conference & Meeting, March 2-3, Clarion Hotel and Conference Center, Hagerstown, MD Poster Paper Abstracts

## Exploring & Assisting Grass-Fed and -Finished Livestock Enterprises

### Management Characteristics of Grass-finished Beef Operations in the Northeastern U.S.

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An on-line survey of self-identified grass-finished beef producers was conducted throughout the Northeast region along with several farm visits. Seventy acceptable records from producers in Delaware, Maine, Massachusetts, Maryland, New Hampshire, New Jersey, New York, Pennsylvania, Vermont, and West Virginia were included in the analysis. The typical farm managed cattle from cow-calf through finish, and had an average of 24 cows and 24 finishers on 141 acres. The average grass-finished animal was finished and marketed for beef at 23 months of age and 1,091 lb. Seventy percent of the total land represented by the survey was grazed and 30% was harvested. Of the producers producing hay from pasture on the farm, 58% reported replanting at some interval and 75% reported using no-till management practices. Eighty-seven percent of farms raised calves from birth to finish, while 13% of farms were finishing operations only. Fifty percent of producers reported purchasing feed for the herd, and dry hay was the most commonly purchased feed. Beef products were most commonly marketed directly to the consumer (89% of producers), although 24% of producers marketed their beef through multiple outlets. Fifty-three percent of producers reported marketing additional species from the farm. Production information provides a basis to evaluate and improve the sustainability of grass-finished beef. This work is part of a national assessment of the sustainability of beef that is being conducted by the National Cattlemen's Beef Association with partial support from the Beef Checkoff.

### Snapshot of Eighty Grass-fed Dairies of the Northeast

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The poster is a preliminary review of surveys received from 80 grass-fed Cow Dairies mainly located in New York and Vermont. The surveys were sent out as part of a Northeast SARE Research and Extension Project: Began September 1, 2016 End: October 31, 2019 titled: *Supporting the Grass-fed Milk Market in the Northeast with Education and Benchmarks*

### PROBLEM AND JUSTIFICATION

Consumer demand for grass-fed dairy products is growing, and dairy farmers are being offered premiums for milk produced without grain. As milk processors add product lines, more grass-fed milk is needed throughout the country and in particular in the Northeast where market demand is soaring. The pay price is \$5.00 per hundred pounds over the typical organic pay price, which is alluring to many farms already feeding low grain diets; however, the transition away from grain can create unique problems and risks for the farm and the animals. Primary concerns include meeting energy demands of lactating cows with only forage, having sufficient quantities of forages to meet herd requirements year around, and maintaining herd health including reproduction and body conditions scores. Many farmers interested in this market will need to make management changes to monitor

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both herd health and production, and to improve forage quantity and quality. This project will provide critical information to farmers to help them make an informed decision on whether grass-fed markets are a viable option for their farm. Further, the project will develop tools to help farmers successfully transition and monitor their grass-fed farms.

The poster "Snapshot of Eighty Grass-fed Dairies of the Northeast" shares some of the information gathered through a survey sent out to the approximately 120 organic dairies shipping to Organic Valley Milk Coop under their Grass-Milk label and Maple Hill Grass-fed Yogurt. These two processors aided the project team by mailing the survey to each of their producers. In a testament to the eagerness of these producers to support the SARE project, we received 80 responses or, a 67% return. Many of them agreed to be part of further parts of the 3-year study. The other parts of the study are:

### **Grass-Fed Monitor:**

For farmers interested in working more closely with the research team, there is the opportunity for farms to share more information with an additional farm data collection survey, a visit to the farm by Sarah Flack, and then participation in the monthly Grass-Fed Monitor. The Grass-Fed Monitor is a data collection tool that will require someone from the farm to fill out a monthly on-line (or paper) survey that will consist of information from your milk check, changes in herd inventory, and forage being fed to the herd. Participation will require the farms to commit to two years of data collection and allow for at least one on-farm visit to collect in-depth farm data.

In return the farm will receive:

- Monthly reports to compare how their performance has changed over the year, the report will also show how their benchmarks compare to other farms in the study.
- Free periodic sampling of forages.
- A monthly stipend for filling out the Grass-Fed Monitor.

### **High Energy Forage Species Study:**

Energy is believed to be the weakest link in an all-forage diet. Determining which forages may help farmers produce the highest energy feed is work that will be done by Dr. Darby at UVM. She will plant trials to help identify high energy forage species that can be grown in the northeast. If you are interested in providing feedback on this trial, please contact Dr. Darby.

### **Putting It All Together:**

The project team will compile the information from the surveys, on-farm visits, and the grass-fed monitor tool to develop a series of educational materials and tools that will help inform the production practices of current and aspiring grass-fed dairies. We look forward to sharing what is learned in this study to support the success of farms as they produce grass-fed milk for this growing market of consumers, who are interested in the nutritional and environmental benefits of these products.

### **Enhancing Research and Education for Grass Farmers**

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The Center for Sustainable Agriculture, Pasture Program (UVM Extension) has established a new research program at a nearby diversified pasture-based farm, to test innovative applied research ideas, explore and enhance collaborations, and share information among farmers, academics, and service providers. This "living laboratory" will help us better understand how to work with Vermont's pasture farmers who are seeking to meet market demand for grass-fed meat while managing their farms using ecological principles. More and more, informed consumers and a better understanding of the health and environmental benefits of producing humanely raised animals in well-managed pastures have increased consumer interest in grass-fed products. While the niche is

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still developing, the demand for grass-fed products has grown at an annual rate of 25-30% per year since 2003\*. We are committed to helping farmers produce the healthiest beef -and other meats- while improving soil health and forage quality under the highest environmental and ethical standards.

Projects already underway are framed under an integrated soil-pasture-animal management approach, in order to improve soil health and enhance forage production and quality to accelerate beef production. Currently, we are studying the following projects: multiple warm- and cool-season cover crop mixes for soil health; animal performance across multiple warm- and cool-season cover crop mixes; effects of woodland shelters on animal production; precision irrigation in perennial and annual pastures, and contributions of composted bedded packs to soil health. Results will be appropriately shared with farming and scientific communities.

\* Williams, A. 2013. The Future of Grassfed: Laying out the Promise and Challenges. *Graze Magazine*

## University of Vermont Center for Sustainable Agriculture's Pasture Program 2016 Annual Report

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### Background

The University of Vermont's Center for Sustainable Agriculture has included pasture-related programming since 1996. The Pasture Program has maintained a formal relationship (MOU) with Vermont NRCS and the Vermont Grass Farmers Association (VGFA) for all of that time, in order to provide staff support to the VGFA, provide some number of pasture educational events, and organize an annual conference. Over time, the Pasture Program has expanded its areas of expertise to include a broad range of grazing and sustainable livestock issues such as bedded pack manure management; livestock production within food system and water quality policy; livestock biodiversity; silvopasture/agroforestry; invasive species management; land reclamation; and quality of life for grass-based farmers. Currently the program includes technical assistance, research, and outreach/educational staff.

### 2016 Activities

#### *Outreach & Education (Jennifer Colby)*

- The 20th Annual VT Grazing & Livestock Conference hosted over 320 farmers and service providers from 6 Northeast states and featured a twenty-year video retrospective.
- Hosted or partnered on 11 pasture or livestock workshops, with 280 attendees on topics of fallow land reclamation, swine, dairy, small ruminants, beef, bedded pack manure management, and season extension.
- Co-chaired the Farm to Plate Network's Production & Processing Working Group and provided guidance for collective work.

#### *Technical Assistance (Kimberly Hagen)*

- In 2016, 52 farmer/producers were provided with technical assistance or consultation
- In addition to regular consultations about improving forage production, decreasing erosion, and building soil health, there were some special themes:
  - Consulting with farmers, local conservation organizations and community groups about using livestock to control invasive species.
  - Managing livestock around solar installations, and understanding what helps to increase the likelihood of success in solar farming partnerships.

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- Professional education around riparian grazing issues, particularly bringing the experience of more Western regions to the Northeast.
- Initiating conversations around the use of wool as renewable and effective insulation
- More efficient use of wooded areas (silvopasture or livestock-perennial agroforestry).

### *Applied Research (Juan Alvez)*

- Established baseline readings for a long term pasture research project looking at weight gain under different forage compositions, pasture improvement methods, compaction, sward density, compost application, and more.
- Partnered on a project analyzing data collection from grass-only dairy cows in order to better understand their health and production.
- Part of a collection of interested silvopasture partners regularly communicating to initiate new Northeast projects together.
- Collected and analyzed data around data moisture sensors and pasture compaction.

## **Livestock Nutrition on Pasture-based Farms**

### **Evaluation of Fodder Production Systems for Grazing Dairy Farms**

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Sprouted grains have gained renewed interest among grazing dairy farmers in response to high grain prices, grain scarcity (in the organic dairy sector) and challenges in producing high-quality forages. This interest has been spurred by high-profile advertising by companies selling the systems, as well as farmer reports of improvements in milk yields, cow health and farm profitability. However, there is little scientific data available on feeding sprouted grains in the temperate regions of the country such as the Northeast or Upper Midwest. We found a 327% increase in fresh weight yield when barley grain was sprouted for 7 days. However, there was a corresponding 17% loss in dry matter (DM). Coupled with a 21% loss in energy, there was a significant net loss in nutrients by sprouting the barley grain. Nutrient digestibility of fodder was not as good as with high-quality pasture. These results suggest that there would likely be a net loss of digestible energy available to the animal, which could negatively impact animal performance and increase feed costs. When 9 kg (as fed) of fodder replaced 2.7 kg of a corn-based concentrate in a TMR, milk production, milk fat, body weight and body condition score of lactating dairy cows were not affected by fodder. Cows fed fodder had slightly greater milk protein and greater milk urea N (16.5 for fodder cows vs. 13.5 for cows not fed fodder). This suggests that cows fed fodder may not have been as efficient in utilizing protein. Income over feed costs (IOFC) favored not feeding fodder except when grain prices increased by 50% over those used in the study (\$11.77/bushel), giving fodder a slight edge (\$0.44/cow/day). However, the initial investment in the fodder system was not included in the IOFC analysis, and therefore, the actual cost of producing fodder would be even higher. Each farm must put pencil to paper to determine if implementing fodder in feeding management is a good idea. Be sure to include all costs in deciding whether the money could be better spent growing or purchasing higher-quality forage.

### **Potential of forage brassicas for use in pasture-based livestock systems**

S. Leanne Dillard<sup>1</sup>, Ana I. Roca-Fernández<sup>1,2</sup>, Melissa D. Rubano<sup>1</sup>, and Kathy J. Soder<sup>1</sup>

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Brassicacae (Brassica spp.) are gaining popularity as high-quality forage for pasture-based livestock producers due to their use to extend the fall grazing season and during the summer forage slump. However, inclusion of brassicas in the diet can be limited by the presence of glucosinolates (a class of plant compounds that can reduce average daily gains and cause off-flavors in meat and milk). To date, little research has been conducted to evaluate forage yield, nutritive value, and the total and individual glucosinolate concentration of brassicas. The objective of this study was to determine yield, nutritive value, and glucosinolate content of 3 brassicas [Appin' turnip (*B. rapa*), 'Barisca' rapeseed (*B. napus*), 'Inspiration' canola (*B. napus*)] and ryegrass ['KB Supreme' annual ryegrass (*Lolium multiflorum*)] grown in central PA. Yield, nutritional composition, and glucosinolate concentration of forage were determined every 2 weeks. Seasonal forage yield was similar among brassica varieties (1,023 kg DM/ha) and lowest in ryegrass (242 kg DM/ha). While crude protein was greater in ryegrass than the brassica varieties (33.1 vs. 29.2%), both degradable and soluble protein fractions were lower in annual ryegrass than all brassicas (76 vs. 84% and 18.7 vs. 14.4%, respectively). While all forages were relatively low in NDF and ADF, ryegrass had greater NDF and ADF than brassicas (35.4% vs. 18.7% and 17.5% vs. 14.1%, respectively). Turnip had the greatest total glucosinolate concentration (27.9 mg/g dry), and rapeseed and canola were 40 and 67% lower, respectively. Annual ryegrass contained no glucosinolates. Inclusion of brassicas in a cool-season pasture rotation has the potential to increase animal productivity and reduce the need for stored feed during periods of perennial cool-season forage shortages, including mid-summer and late fall; however, glucosinolate levels must be considered to reduce potential negative impacts on animal health and off-flavors in milk and meat.

## **Effect of feeding legumes containing condensed tannins with orchardgrass on ruminal fermentation and methane production in continuous culture**

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Developing feeding strategies that allow farmers to reduce methane (CH<sub>4</sub>) emissions from livestock is gaining interest world-wide. Legumes containing condensed tannins (CT) have been shown to decrease enteric CH<sub>4</sub> in ruminants; however, research is lacking on how increased CT levels affect ruminal fermentation and CH<sub>4</sub> production. A 4-unit continuous culture fermentor system was used to assess nutrient digestibility, volatile fatty acid (VFA) production, bacterial protein synthesis and CH<sub>4</sub> production of 4 legumes containing varying levels of CT. The legumes were: alfalfa (ALF) as control, birdsfoot trefoil (BFT) as a low CT legume, crown vetch (CV) as an intermediate CT legume, and sericea lespedeza (SL) as a high CT legume. Treatments consisted of 50% orchardgrass and 50% legume. Each treatment was assigned to 4 fermentors in a randomized block design with 4 replicates. Feeding occurred 4 times daily throughout 4, 10-d periods using 7 d for adaptation and 3 d for collection. Samples for dry matter (DM), organic matter (OM), crude protein (CP), acid detergent fiber (ADF) and neutral detergent fiber (NDF) were collected to determine nutrient digestibilities. Samples were also taken for VFA analysis and bacterial protein synthesis. Gas samples for CH<sub>4</sub> analysis were recorded by a photoacoustic field gas monitor. All samples were statistically analyzed using treatment as fixed effect and fermentor and period as random effects. Apparent and true DM and OM digestibilities were lower ( $P < 0.01$ ) in SL than ALF and BFT, with CV showing an intermediate level. Apparent NDF and ADF digestibilities were lowest ( $P < 0.001$ ) in SL, without any differences among the other treatments. Total VFA were lower ( $P < 0.001$ ) in SL than ALF and BFT, with CV showing an intermediate level. Lower ( $P < 0.001$ ) N intake was found in SL than ALF, with BFT and CV showing intermediate levels. Bacterial N efficiency per kg of truly digested DM and OM was lower ( $P < 0.05$ )

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in SL than BFT, with ALF and CV showing intermediate levels. Total CH<sub>4</sub> production was lower ( $P < 0.001$ ) in SL than in the other treatments. No differences were found between ALF, BFT and CV for CH<sub>4</sub> production per g of DM and OM fed or per g of digestible DM and OM fed, with SL showing the lowest CH<sub>4</sub> production per unit of digestible nutrients. In summary, introducing high CT legumes in ruminant diets may be an environmentally-friendly feeding strategy for grazing dairy and livestock farmers to reduce CH<sub>4</sub> emissions, however, tradeoffs in reduced nutrient digestibility, VFA production and bacterial N efficiency must be considered.

Keywords: condensed tannins, continuous culture, methane emissions

*As previously presented: Goossen, C.P., S.C. Bosworth, J. Kraft. Can grazing selectivity reduce fatty acid intake declines in maturing annual forages? Poster presented at the American Society of Agronomy, Crop Science Society of American, and Soil Science Society of America annual meeting. November 9, 2016. Phoenix, AZ, US.*

## Can Grazing Selectivity Reduce Fatty Acid Intake Declines in Maturing Annual Forages?

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Maximizing grazing availability is important to all organic dairy farmers, and particularly for grain-free “grassmilk” producers. Many producers are utilizing annual forage crops to provide supplemental grazing when perennial pasture is less productive. Annual forages are known to quickly diminish in nutritive quality as they mature however. We posit that grazing selectivity may ameliorate some of the quality decline of maturing annual forages, including the content and profile of fatty acids (FA) which are a key marketing component of grassmilk. Whole plant analysis may under-estimate the quality of a selectively grazed forage, thus our study utilizes differences of weighted means of lamina and pseudostem components. Species investigated include an overwintered small grain (cereal rye) and a warm season summer annual (pearl millet). Preliminary data from cereal rye shows that the polyunsaturated FA alpha-linolenic acid (ALA) - the primary FA in vegetative forages - is present in similar proportions in late vegetative and early head emergence stage laminae (70.9 and 73.2 g 100g<sup>-1</sup> total FA, respectively,  $p=0.1052$ ) and pseudostem (46.3 and 45.1 g 100g<sup>-1</sup> total FA,  $p=0.2013$ ). While decreases in ALA content occur with increasing maturity on a forage dry weight basis, the decline in lamina content is insignificant (29.5 to 27.1 mg g<sup>-1</sup> forage,  $p=0.5785$ ) and pseudostem content decline (8.8 to 6.5 mg g<sup>-1</sup> forage,  $p=0.0045$ ) is less than the overall decline on a whole plant basis (16.4 to 9.8 mg g<sup>-1</sup> forage,  $p=0.0008$ ) due to the increased proportion of pseudostem relative to laminae in boot stage annual forages. As such, the ingested dry weight ratio of laminae relative to pseudostem in annual forages has a greater impact upon the overall FA profile than maturity stage, and therefore FA intake from annual forages is potentially manipulable through changes in grazing pressures. Millet data is also presented.

## Manure Management on Pasture-Based Farms

### Deep-Bed Pack Livestock Facility Planning Tool

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## Background:

Vermont NRCS provided cost-share assistance to farmers for bedded pack manure facilities for several years before determining that farmers required more education to properly manage them. A workshop was developed, featuring a spreadsheet calculating bedding needs and material costs to farmers in order to provide better planning information. Visiting NRCS staff improved and updated the tool, making it more accurate and user friendly. The tool is available for free at [www.uvm.edu/pasture](http://www.uvm.edu/pasture).

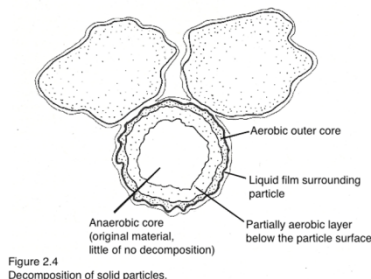
## Why Bedded Packs?

### Pros

- Protect water quality
- Improve soil quality
- Animal health & comfort
- Higher air quality
- Conventional manure handling

### Cons

- High bedding costs & changing availability
- High labor/management
- High maintenance, structure costs
- Handling manure multiple times
- If not maintained properly, high SCC



## Characteristics of a Proper Thermophilic Compost Pile Blend

*All Parameters are critical to an effective recipe*

- **C:N Ratio of 20-40:1 with most ideal being 25-30:1**
- **Moisture Content of 50-65% with the most ideal being 55-60%**
- Bulk Density Below 1200 lbs/yd<sup>3</sup> with ideal being 700-1000 lbs/yd<sup>3</sup>
- pH between 6-8
- >40% Volatile Solids (or Organic Matter)
- Pore Space (30-33%) and Material Structure
- Stackability – does matter compress/compact?

## Managed Compost – Needs Oxygen

Aerobic 5-15% Oxygen

Semi-Aerobic 2.5-5% Oxygen

## Managed Compost – Moisture Levels

- Starting moisture should be 55-60% for outdoor windrow composting
- 60-65% moisture ideal for aerated composting
- Above 70% leads to leaching (runoff and loss of nutrients) and reduces porosity for oxygen
- Below 50% moisture is insufficient for good biological activity
- Squeeze test should feel like damp sponge

To access downloadable calculation spreadsheets, videos and other bedded pack resources, visit:  
[www.uvm.edu/pasture](http://www.uvm.edu/pasture) “Bedded Pack Manure Management Resources”