ORGANIC DAIRY COST OF PRODUCTION PROJECT

Jen Miller
NOFA-VT Farmer Services Program
March 14, 2019

Farms in the study

2017 financial information collected from 34 farms

- 29 organic farms (used data from 28)
- 5 organic, 100% grass-fed farms

VT Organic Dairy Participants (n = 28)	
Average # of Cows	81.4
Lbs Shipped Total	1,294,173
Lbs shipped/cow	14,942
Milk price	$36.90

Farms in the study

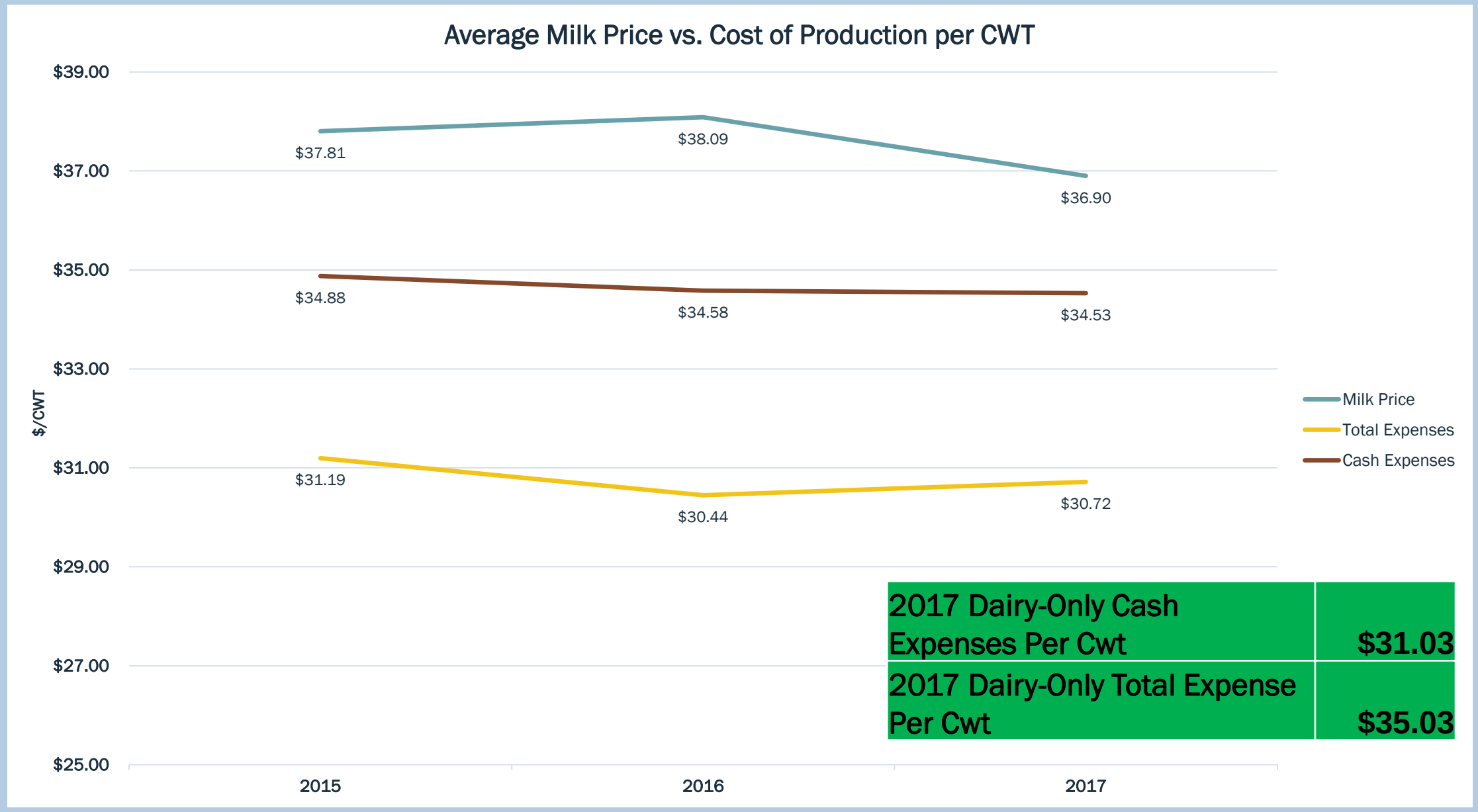
BY HERD SIZE

Cow Group	Cost of Production Study	VOF Farms
1	40	32
2	57	58
3	136	131
Average	78	74

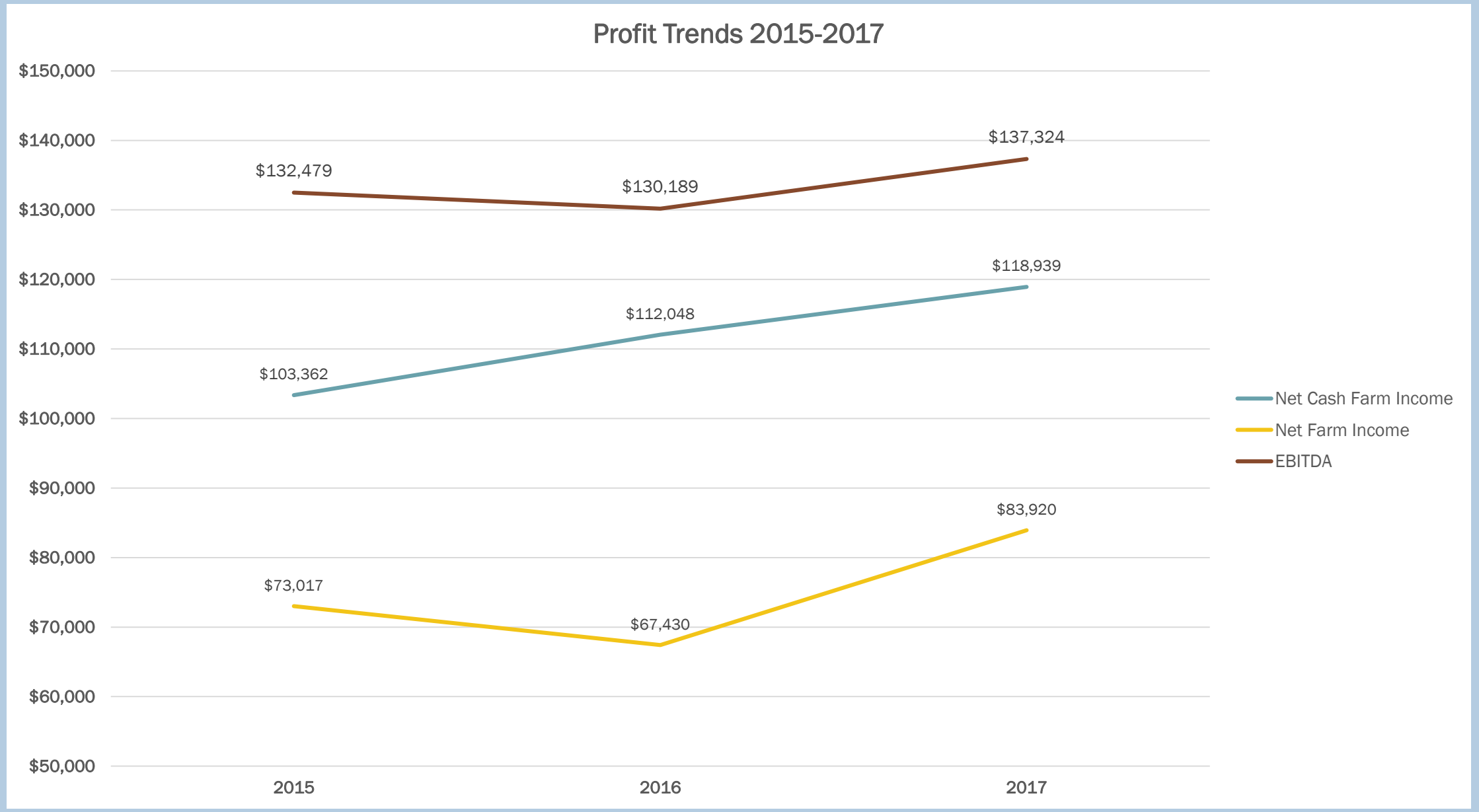
Farms in the study

BY MILK BUYER

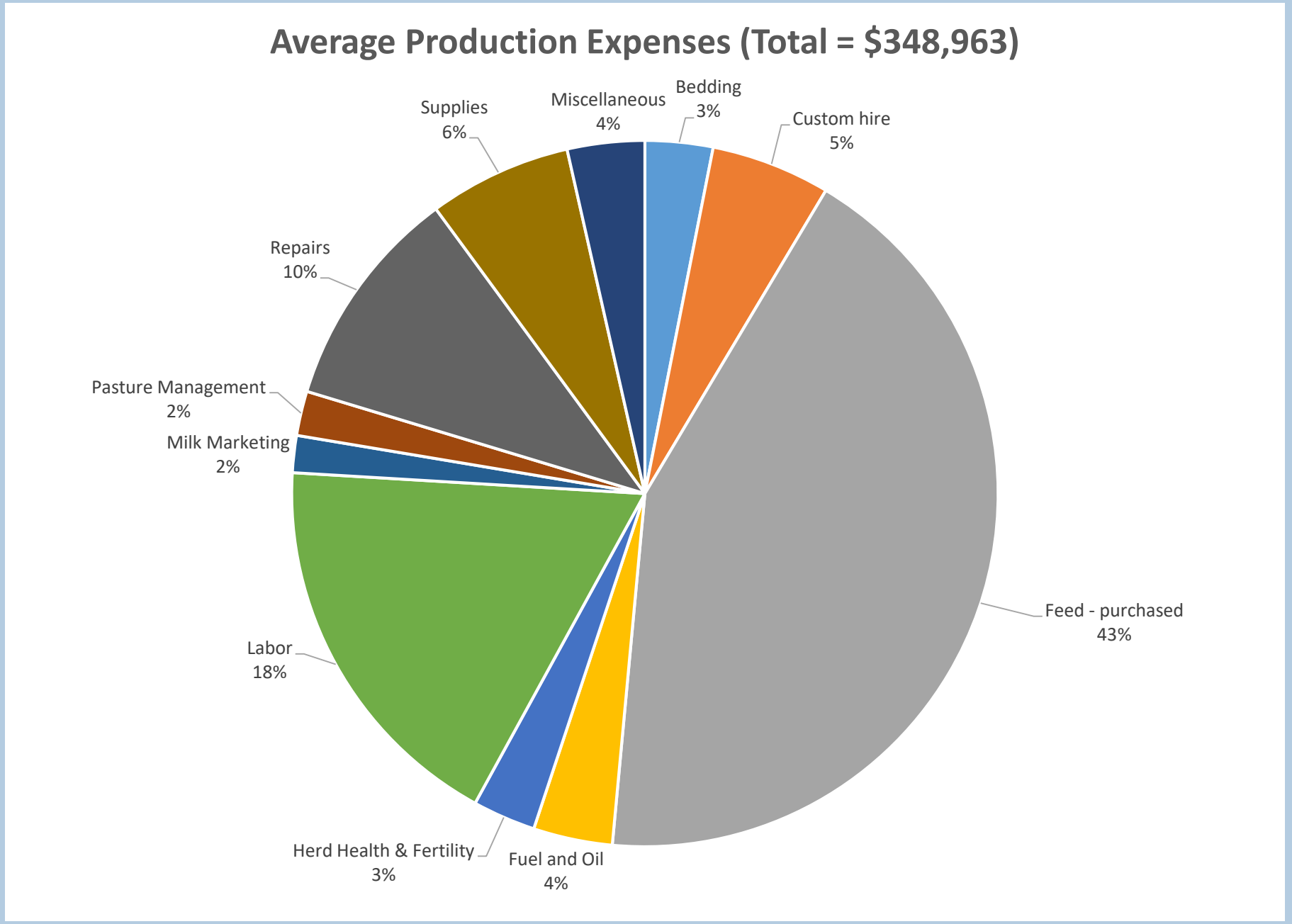
Milk Buyer	Cost of Production Study	VOF Farms
OV	65%	67%
Stonyfield	15%	11%
Horizon	21%	22%


Average Milk Price vs. Cost of Production per CWT
$39.00
$37.00
$35.00
$33.00
$31.00
$29.00
$27.00
$25.00
$/CWT
$37.81
$38.09
$36.90
$34.88
$34.58
$34.53
$31.19
$30.44
$30.72
2015
2016
2017
Milk Price
Total Expenses
Cash Expenses
2017 Dairy-Only Cash Expenses Per Cwt
$31.03
2017 Dairy-Only Total Expense Per Cwt
$35.03

By Profitability Group	Bottom Third	Middle Third	Top Third	All Farms
	N=10	N=9	N=9	N=28
Average # of cows	66.8	49.4	129.6	81.4
Lbs shipped total	946,543	713,462	2,261,140	1,294,173
Lbs shipped/cow	14,194	13,664	17,050	14,942
Milk price	$36.24	$37.10	$37.44	$36.90
Cash Expenses/CWT	$32.67	$29.86	$29.40	$30.72


Profit Trends 2015-2017
$150,000
$140,000
$130,000
$120,000
$110,000
$100,000
$90,000
$80,000
$70,000
$60,000
$50,000
2015
2016
2017
$132,479
$130,189
$137,324
$103,362
$112,048
$118,939
$73,017
$67,430
$83,920
Net Cash Farm Income
Net Farm Income
EBITDA

	2015	2016	2017
Debt/Cow	$3,389	$3,337	$3,215
Interest Expense/Cow	$115	$115	$112
Average Assets/Cow	$17,246	$18,235	$17,549
Average Equity/Cow	$13,856	$14,898	$14,334
Debt/Asset Ratio	6.0%	5.7%	5.8%


Average Production Expenses (Total = $348,963)
Bedding 3%
Custom hire 5%
Feed - purchased 43%
Fuel and Oil 4%
Herd Health & Fertility 3%
Labor 18%
Milk Marketing 2%
Pasture Management 2%
Repairs 10%
Supplies 6%
Miscellaneous 4%

By Profitability Group	Bottom Third N=10	Middle Third N=9	Top Third N=9	All Farms N=28
Average # of cows	66.8	49.4	129.6	81.4
Lbs shipped/cow	14,194	13,664	17,050	14,942
Variable Expense/Cow	$4,126	$3,515	$4,313	$3,990
Fixed Expense/Cow	$541	$572	$703	$603
Grain Purchased/Cow	$1,503	$1,361	$1,810	$1,556
Forage Purchased/Cow	$169	$241	$52	$155
Paid Labor Expense/Cow	$714	$231	$866	$608
Paid Labor Expense/CWT	$5.03	$1.58	$5.07	$3.93

Thank you!

To all the farmers who participated

&

To our project supporters

- University of Vermont
- Stonyfield Farm
- Organic Valley/Cropp
- Whitewave/Horizon
- Vermont Agency of Agriculture
- Yankee Farm Credit
- NODPA
- Green Mountain Feeds

Allen Wilder – UVM MS. Candidate
Sid Bosworth – Extension Agronomist

Energy Dense Legume-Grass Mixtures for High Forage Diets

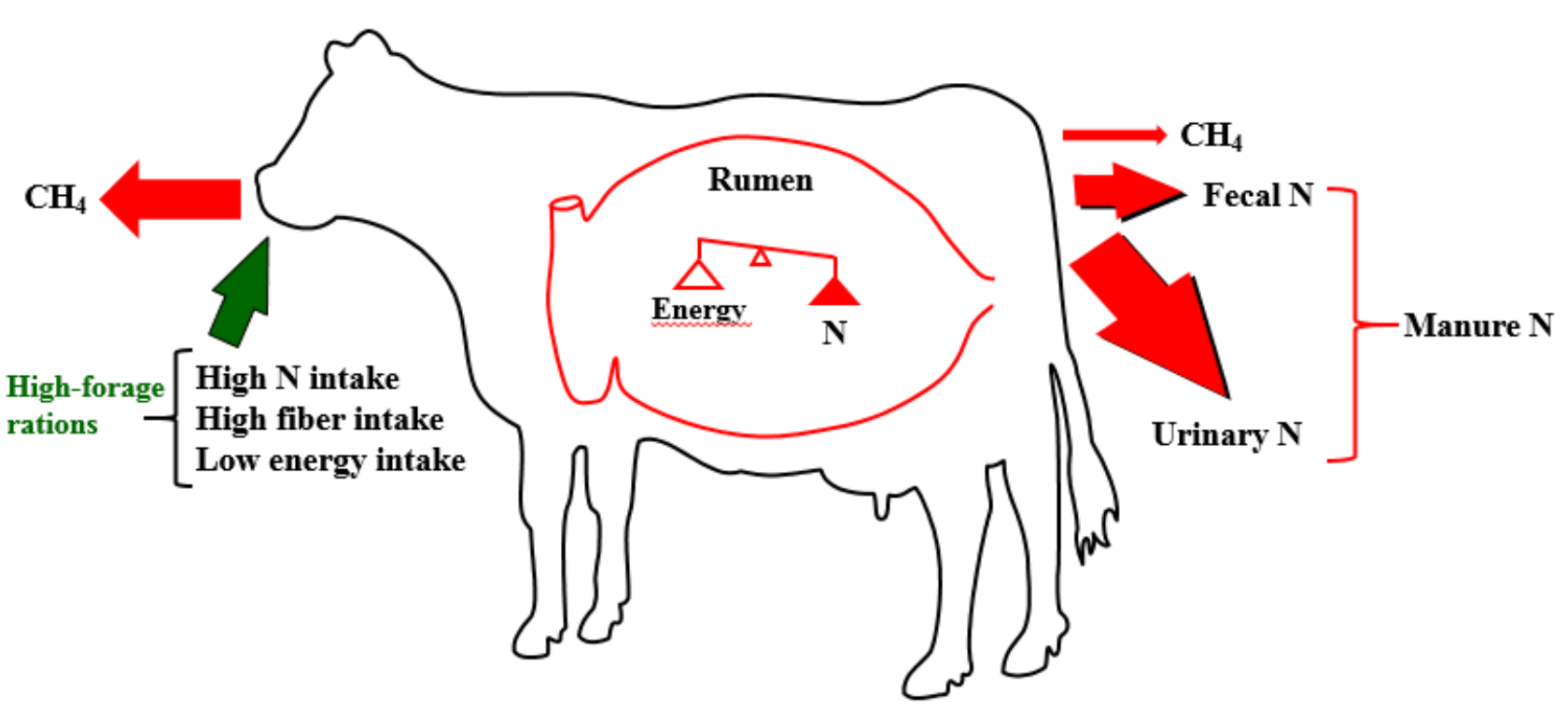
University of Vermont Extension

University of New Hampshire

USDA NIFA

INTEGRATED RESEARCH, EDUCATION, AND EXTENSION COMPETITIVE GRANTS PROGRAM – ORGANIC TRANSITIONS

Introduction



Brito, 2017 USDA NIFA Grant Proposal

MML SILAGE, New York, October 2018

Item	Samples	Average	Normal Range	
% Dry Matter	118	40.807	30.429	51.184
% Crude Protein	118	20.841	18.084	23.598

Dairy One Laboratories Commercial Feed Library, 2019

The Study

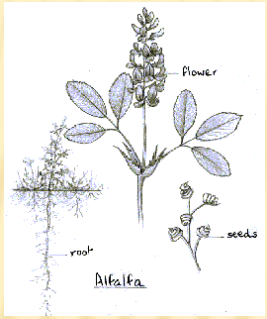
Located at the UVM Horticultural Research Farm,
Adams Sandy Loam Soil

Management:

3 Cut (Lax)
VS.
4 Cut (Intense)

30 Treatments
Four replications
120 plots

Legumes:



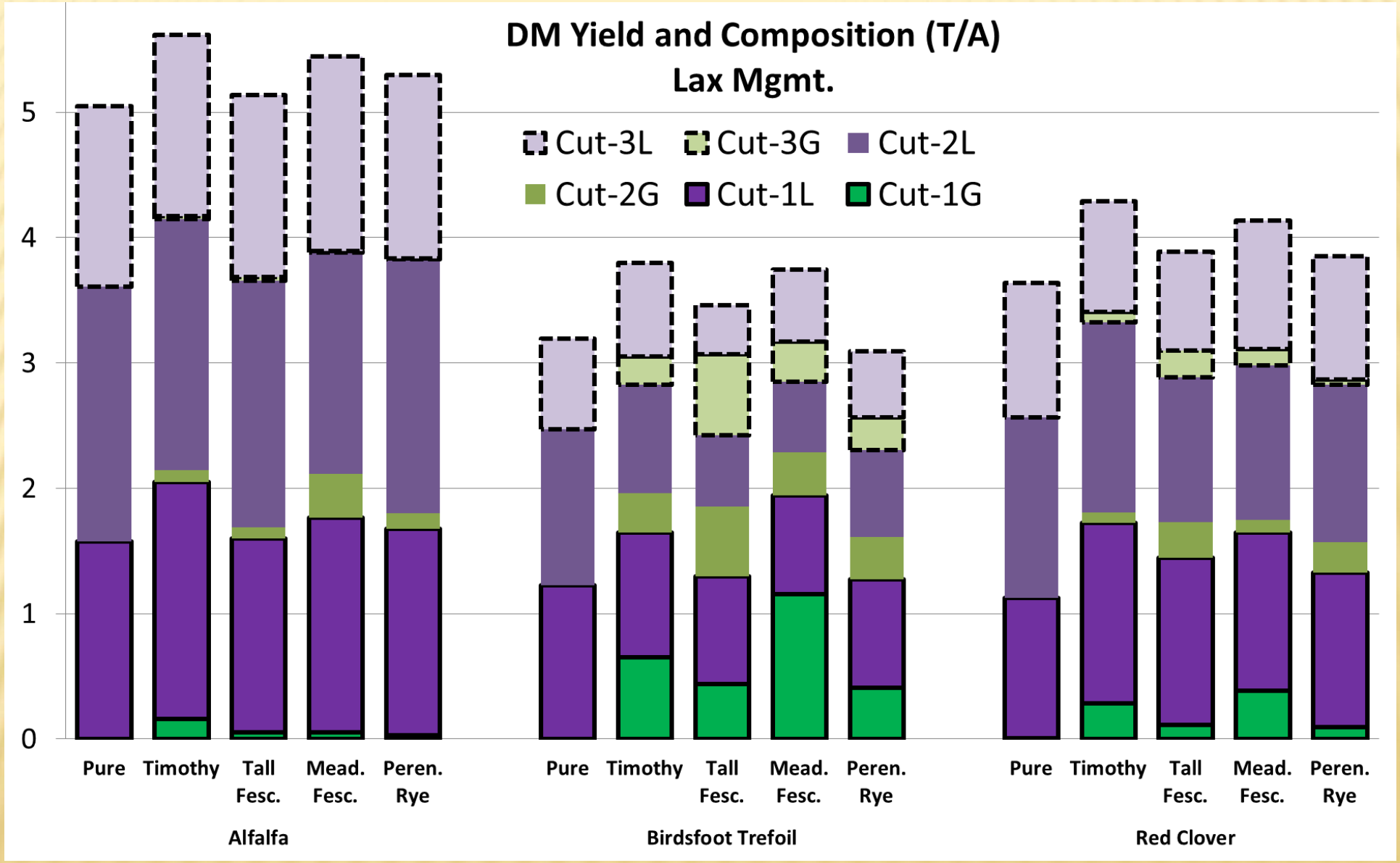
Grasses:

\+ Tall Fescue
Meadow Fescue
Perennial Ryegrass
Timothy

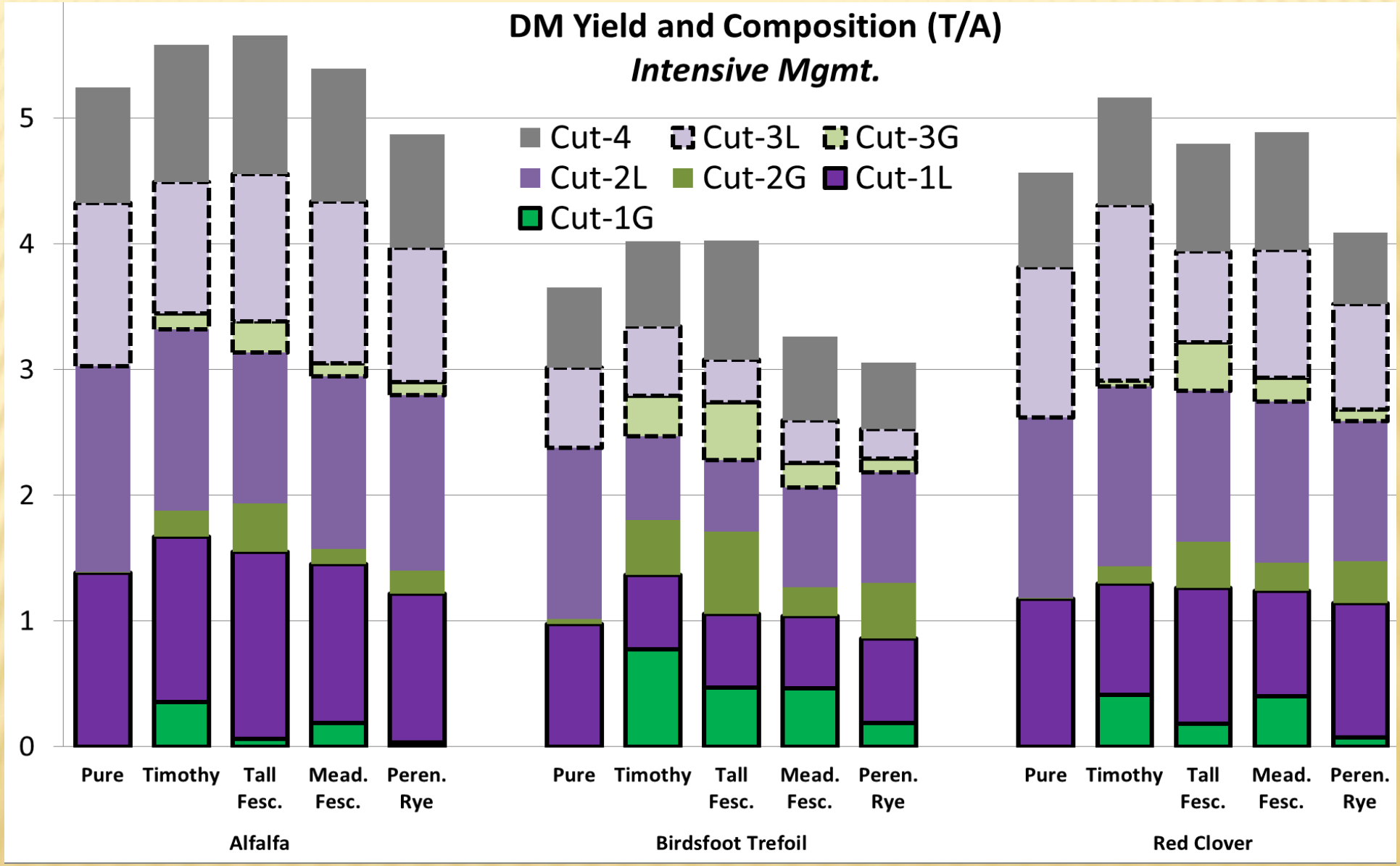
https://www.anniesremedy.com/trifolium-pratense-red-clover.php; https://www.hepatitiscfree.com/alfalfa_book.htm; http://www.pfaf.org/user/Plant.aspx?LatinName=Lotus+corniculatus

The Study

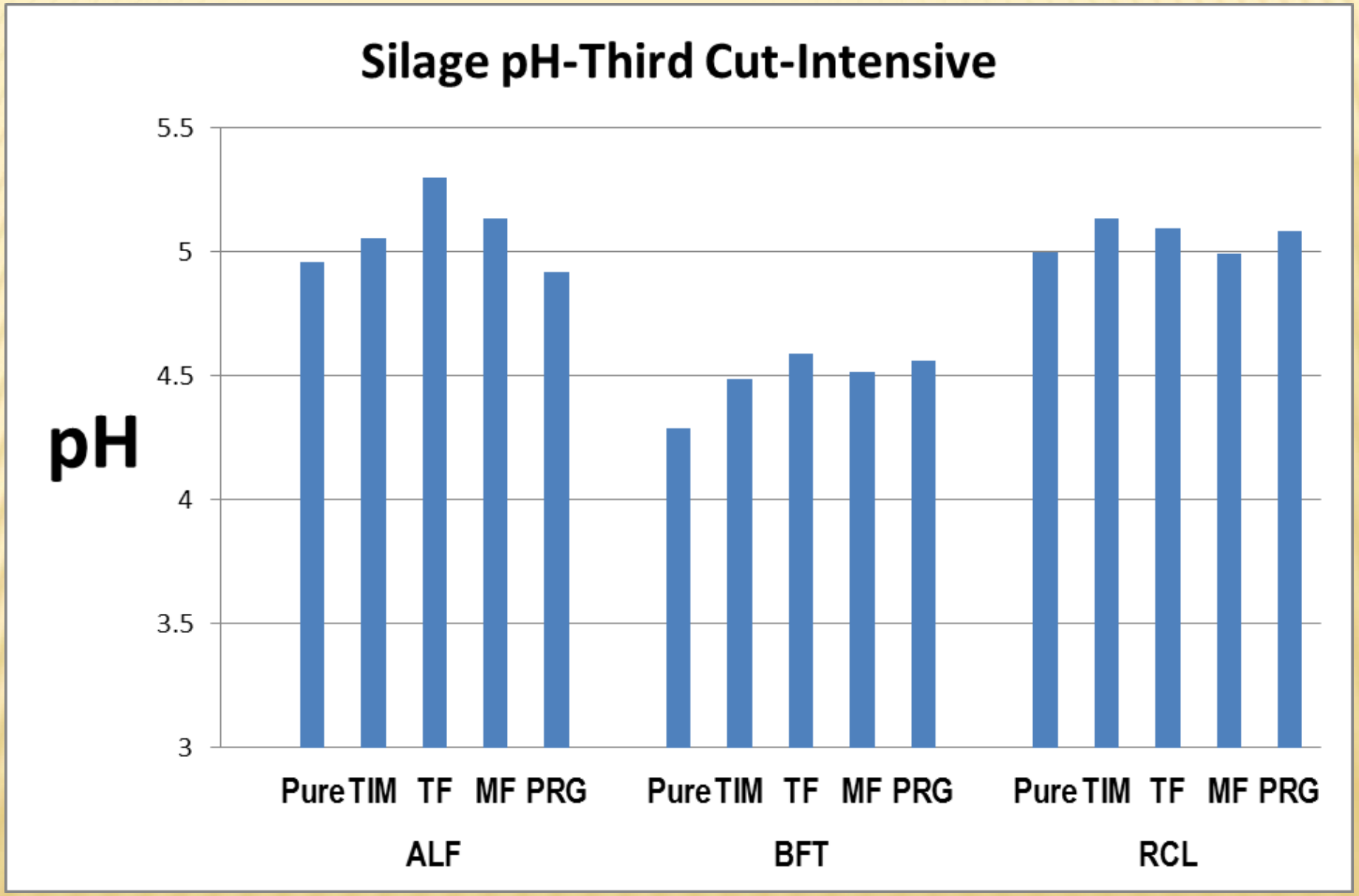
Preliminary Results – Yield and Composition



Preliminary Results – Yield and Composition



Preliminary Results - Fermentation



THANK YOU!

USE OF NYLON BAG TECHNIQUE IN FISTULATED CATTLE TO ASSESS FORAGE NUTRIENT PROFILES

Miriam Snider

PhD Student – University of Vermont

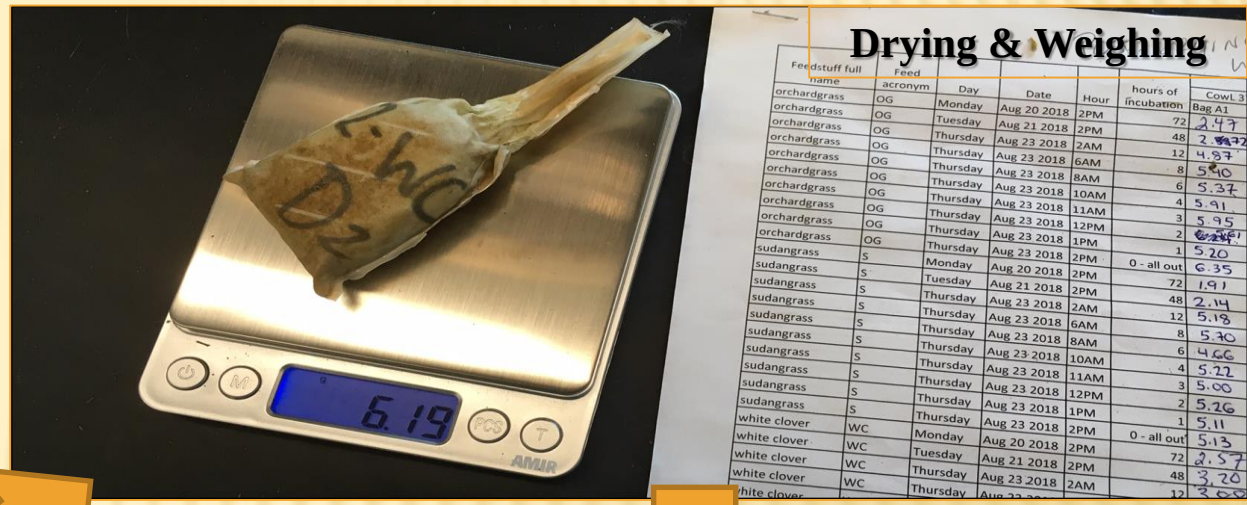
NYLON BAG STUDY - FORAGE DIGESTION

- Orchard grass
  - Staple in forage-based systems in New England
- Other forages (individual or in combination) may provide a better nutrient profile while using the same land area.
- Forages analyzed in this study:
  - Orchard grass, sudan grass, millet, meadow fescue, white clover


Harvest:
Pre-heading (grasses) or
Pre-blooming (legumes)

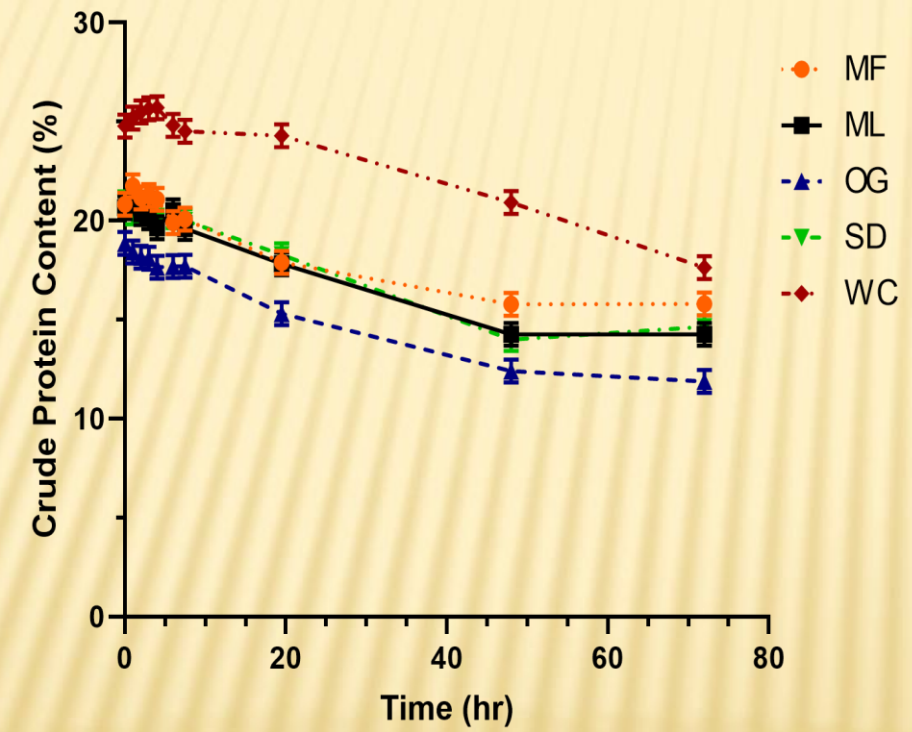

Drying, Grinding,
& Bagging


Rumen Insertion for
up to 72 h


Drying & Weighing
6.19
Feedstuff full name
Feed acronym
Day
Date
Hour
hours of incubation
CowL3
orchardgrass OG Monday Aug 20 2018 2PM 72 2.47
orchardgrass OG Tuesday Aug 21 2018 2PM 48 2.87
orchardgrass OG Thursday Aug 23 2018 2AM 12 4.87
orchardgrass OG Thursday Aug 23 2018 6AM 8 5.40
orchardgrass OG Thursday Aug 23 2018 8AM 6 5.37
orchardgrass OG Thursday Aug 23 2018 10AM 4 5.91
orchardgrass OG Thursday Aug 23 2018 11AM 3 5.95
orchardgrass OG Thursday Aug 23 2018 12PM 2
orchardgrass OG Thursday Aug 23 2018 1PM 1 5.20
sudangrass S Monday Aug 20 2018 2PM 0 - all out 6.35
sudangrass S Tuesday Aug 21 2018 2PM 72 1.91
sudangrass S Thursday Aug 23 2018 2PM 48 2.14
sudangrass S Thursday Aug 23 2018 2AM 12 5.18
sudangrass S Thursday Aug 23 2018 6AM 8 5.30
sudangrass S Thursday Aug 23 2018 8AM 6 4.66
sudangrass S Thursday Aug 23 2018 10AM 4 5.22
sudangrass S Thursday Aug 23 2018 11AM 3 5.00
sudangrass S Thursday Aug 23 2018 12PM 2 5.26
sudangrass S Thursday Aug 23 2018 1PM 1 5.11
white clover WC Monday Aug 20 2018 2PM 0 - all out 5.13
white clover WC Tuesday Aug 21 2018 2PM 72 2.57
white clover WC Thursday Aug 23 2018 2PM 48 3.20
white clover WC Thursday Aug 23 2018 2AM 12 3.58

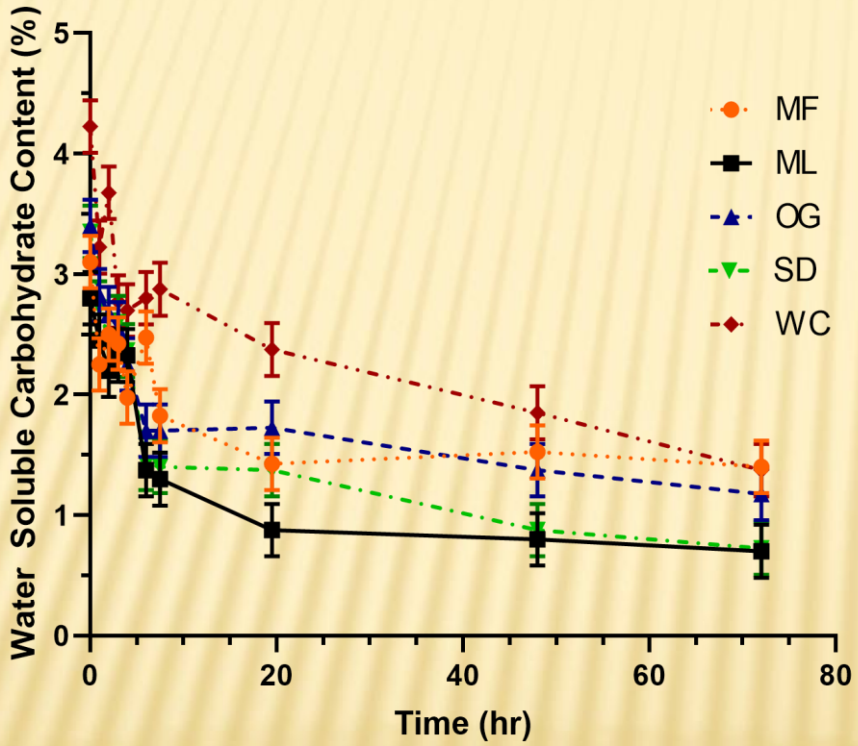

Pooling, Grinding,
& Analysis
2-SA
72-SB
48-SD

CRUDE PROTEIN CONTENT AFTER 72 H



- White clover (red line)
  - Greater amounts of CP present until 72 h
  - Equivalent to meadow fescue (orange line) at 72 h
- Meadow fescue CP content was equivalent to that of millet and sudan grass at 72 h.
- Orchard grass (blue line)
  - Lowest CP content at 72 h

WATER SOLUBLE CARBOHYDRATE CONTENT AFTER 72 H



- White clover (red line)
  - Greatest amounts of WSC at h 2 and 7.5
  - WSC content was equivalent to all other forages by 72 h

MOVING FORWARD – RUMEN DEGRADATION KINETICS

- Next proposed step:
  - **Continuous culture experiment**

Parameters of interest:

- Fermentation rates & patterns
- Microbial nitrogen flows
- CH_4 production
- VFA production patterns
- Microbial profiles
- Enzyme patterns

NUTRITION ON PASTURE BASED DAIRIES

Ariel Ayers, M.S. Candidate

University of Vermont

The University of Vermont
COLLEGE OF AGRICULTURE AND LIFE SCIENCES
DEPARTMENT OF ANIMAL AND VETERINARY SCIENCES

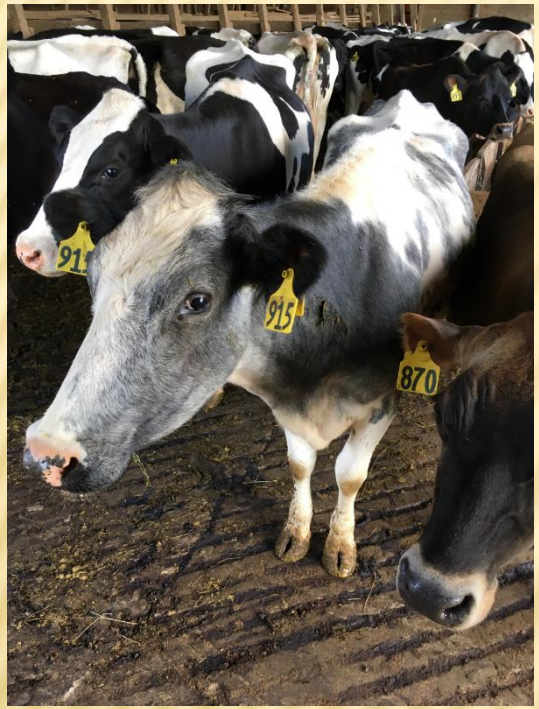
BACKGROUND

- 16 organic dairy farms across the state of Vermont were surveyed during the grazing season of 2017.
- Monthly sampling included:
  - Animal level:
    - Milk production, body condition score.
  - Plant level:
    - Pasture profile, mass.
  - Farm level:
    - Grazing management, feeding strategies.
- The results showed that milk urea nitrogen (MUN) numbers across all farms varied drastically, indicating protein intake as a limiting factor.

MATERIALS AND METHODS

- 6 organic dairy farms across the state of Vermont.
- Sampling occurred for 2 consecutive days once a week per farm.
- 6 week trial during summer 2018, with a 2 week baseline period and a 4 week experimental period.
- Farms were paired by 2017 MUN profile and assigned to groups by current crude protein (CP) content in supplement:
  - Control (CON, n=3 farms)
    - Continued with their regular supplements
  - Treatment (TRT, n=3 farms)
    - 16% CP content
    - Organic barley and roasted soybean mix

MEASUREMENTS



- Gather information from the farmer.
- Collect milk and feed samples.
- Body Condition Score.

Post-Graze Pasture:

- Plate Meter
- Quadrat Cuts
- Pasture Area

Pre-Graze Pasture:

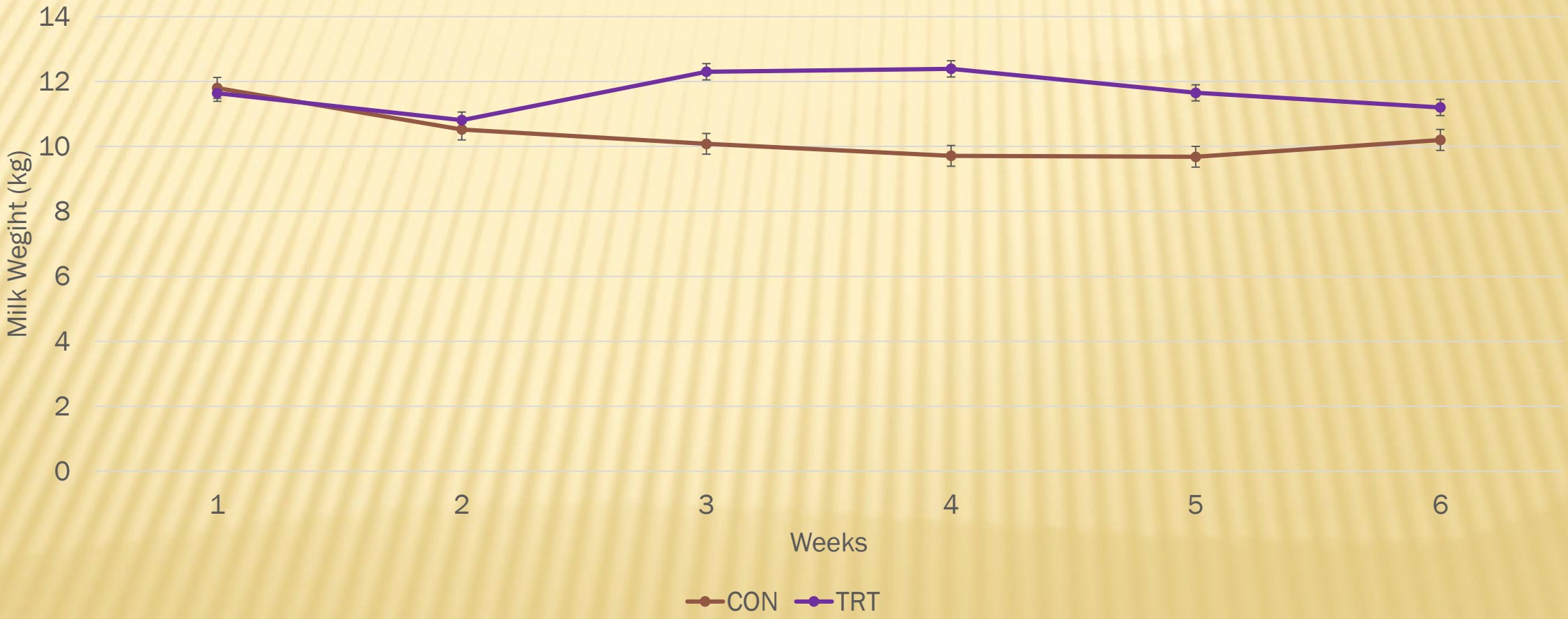
- Botanical
- Plate Meter
- Quadrat Cuts
- Pasture

PASTURE PROFILES

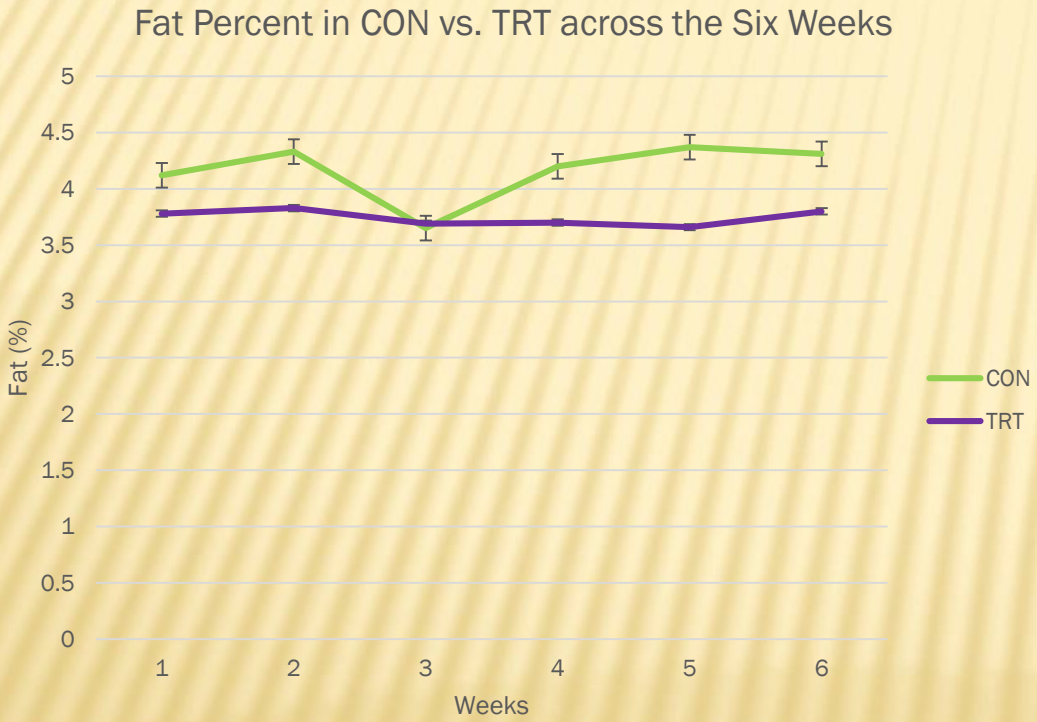
- Botanical Composition
  - Grass average: 63.75%
  - Legume average:16.40 %
  - Weed average: 12.47%
  - Dead material average: 8.70%

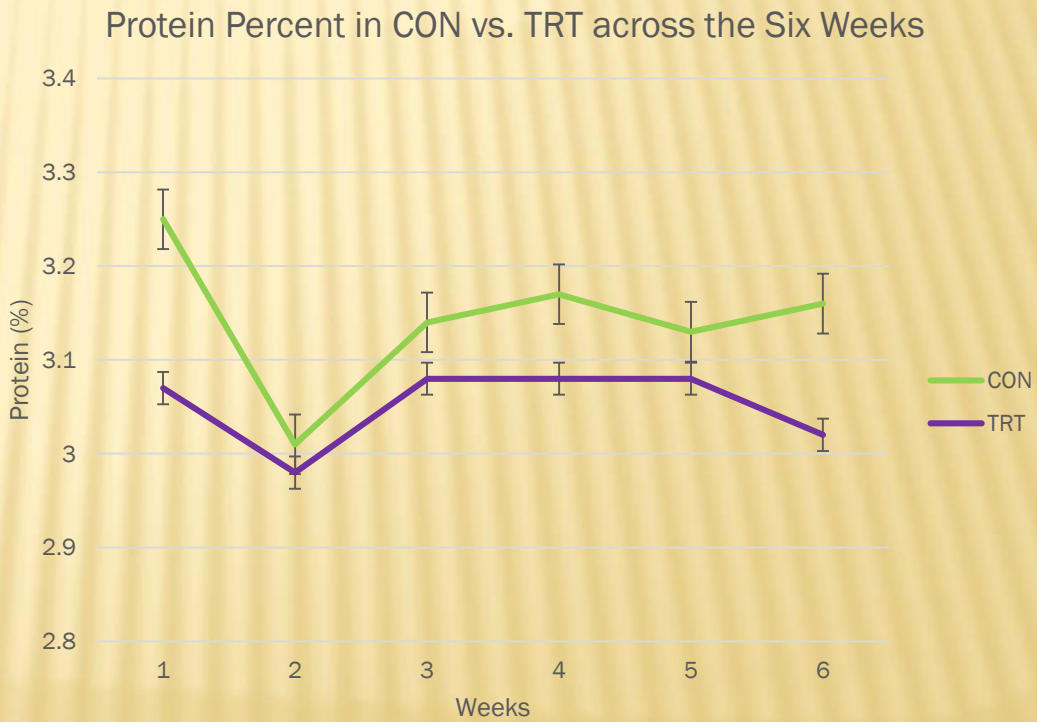
- NIR Analysis
  - WSC average: 9.7 ± 0.9
  - Fat average: 2.8 ± 0.2
  - Protein average: 17.6 ± 1.6
  - aNDF average: 50.3 ± 3.0
  - ADF average: 28.9 ± 1.8

MILK YIELD AVERAGES OF CON GROUP AND TRT GROUP OVER THE SIX WEEK TRIAL

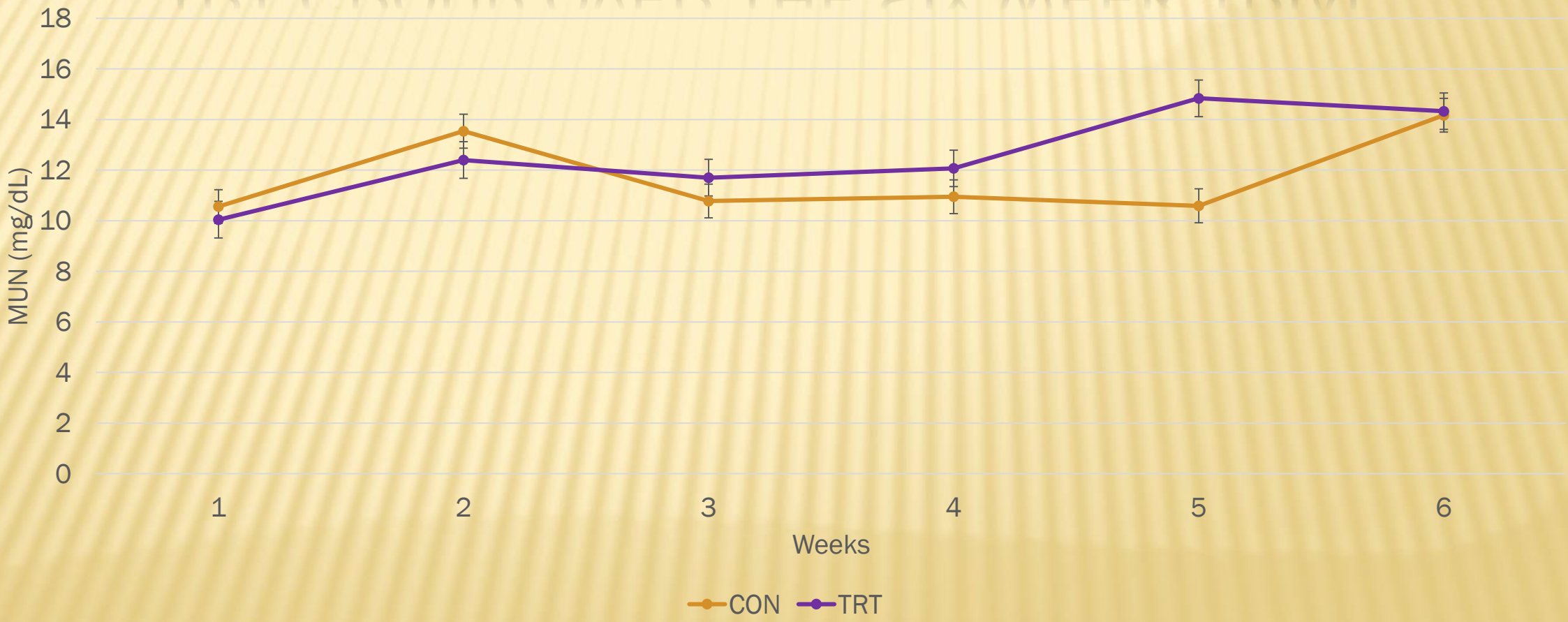


FAT PERCENT AND PROTEIN PERCENT OVER THE SIX WEEKS





MUN PROFILE AVERAGES OF CON GROUP AND TRT GROUP OVER THE SIX WEEK TRIAL



CONCLUSION

- The increase in milk yield in the TRT group indicates protein intake was a limiting factor in milk production.
- Further formulation should be done to determine impact on fat percent and protein percent.
- Dietary considerations should ensure MUN profile remaining in optimum range.

University of New Hampshire
College of Life Sciences and Agriculture

Highlights of kelp meal research at UNH

André F. Brito, Veterinarian, M.S., Ph.D.
Associate Professor of Dairy Cattle Nutrition and Management
Department of Agriculture, Nutrition, and Food Systems
University of New Hampshire
Email: andre.brito@unh.edu
Office phone: (603) 862-1341

Kelp meal studies objectives at UNH

- Investigate the impact of kelp meal supplementation on milk production, nutrient digestibility, animal health, and methane (CH_4) emissions during the grazing and winter seasons

- Improving the understanding of iodine metabolism in dairy cows fed kelp meal year-round

University of New Hampshire

Use of kelp meal in organic dairy farms in the Northeast and Midwest US

- 59% of organic dairy farmers feed kelp meal in the Northeast (Antaya et al., 2015)
- 49% of organic dairy farmers feed kelp meal in Wisconsin (Hardie et al., 2014)
- 83% of organic dairy farmers feed kelp meal in Minnesota (Sorge et al., 2016)

Why organic dairy farmers feed kelp meal in the Northeast?

- It improves body condition and overall animal appearance
- It decreases milk somatic cell count, reproductive problems, and incidence of “pinkeye” (i.e., infectious bovine keratoconjunctivitis)
- It helps with control of nuisance flies during the grazing season

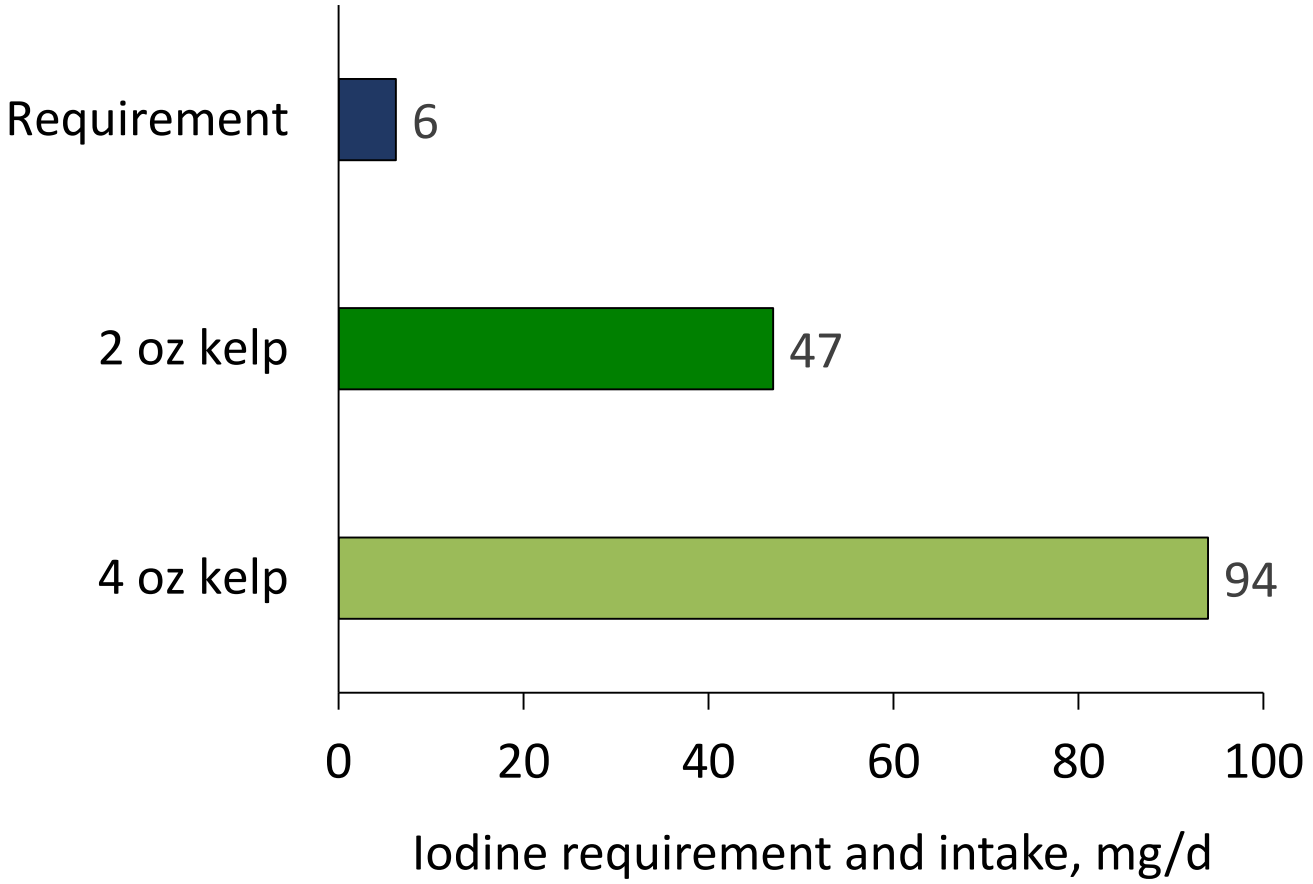
Source: Antaya et al. (2015)

Pasture vs. kelp meal nutritonal composition

Item	Feeds	
	Pasture	Kelp meal
	-----% of dry matter (unless otherwise noted)-----	
Crude protein	19.5	10.2
NDF	51.0	53.9
ADF	31.4	39.9
Ca	0.76	1.31
P	0.36	0.25
Mg	0.28	0.69
K	2.68	3.53
S	0.28	2.84
I, ppm	0.62	820

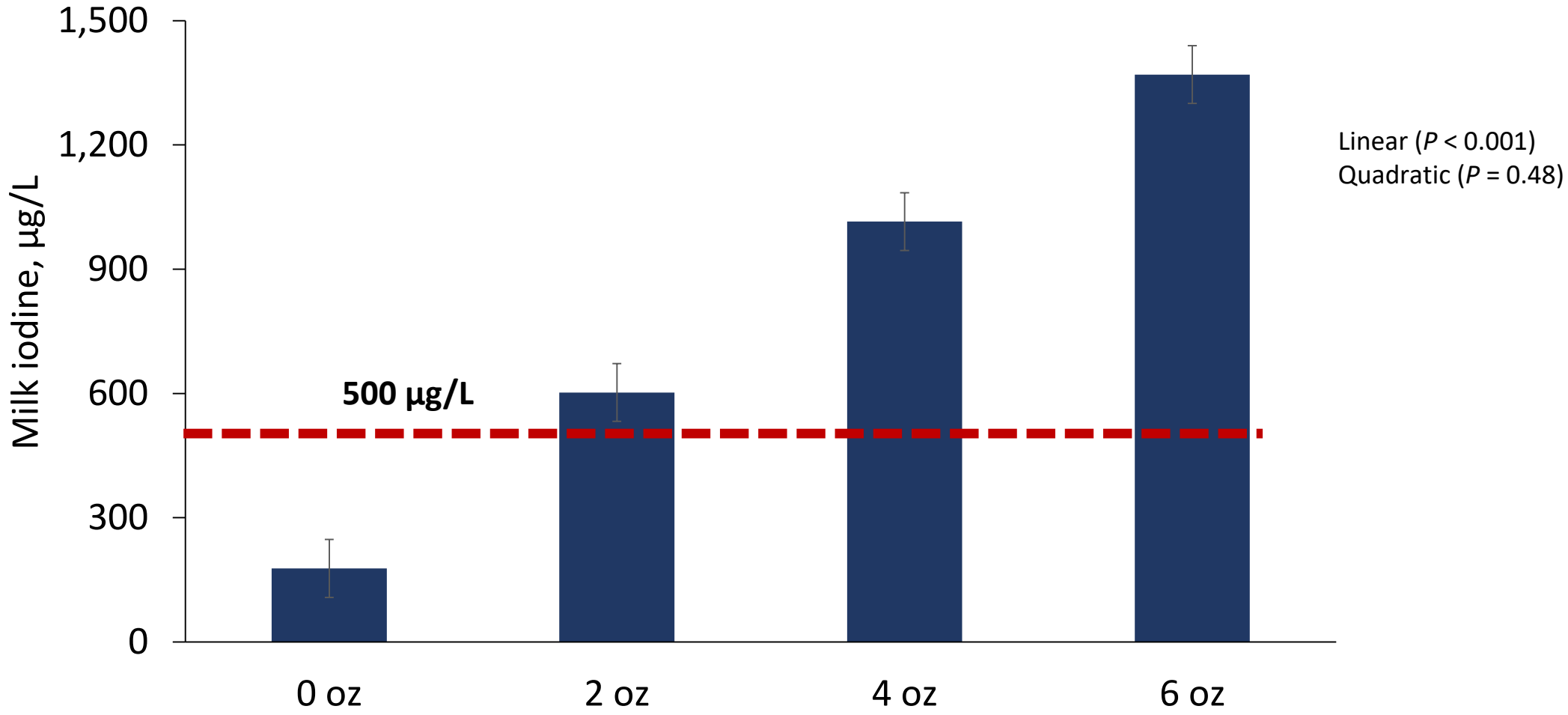
Sources: Antaya et al. 2015; Hafla et al. (2016); Brito et al. (unpublished)

Iodine intake with feeding 2 oz or 4 oz of kelp meal relative to iodine requirement of lactating dairy cows



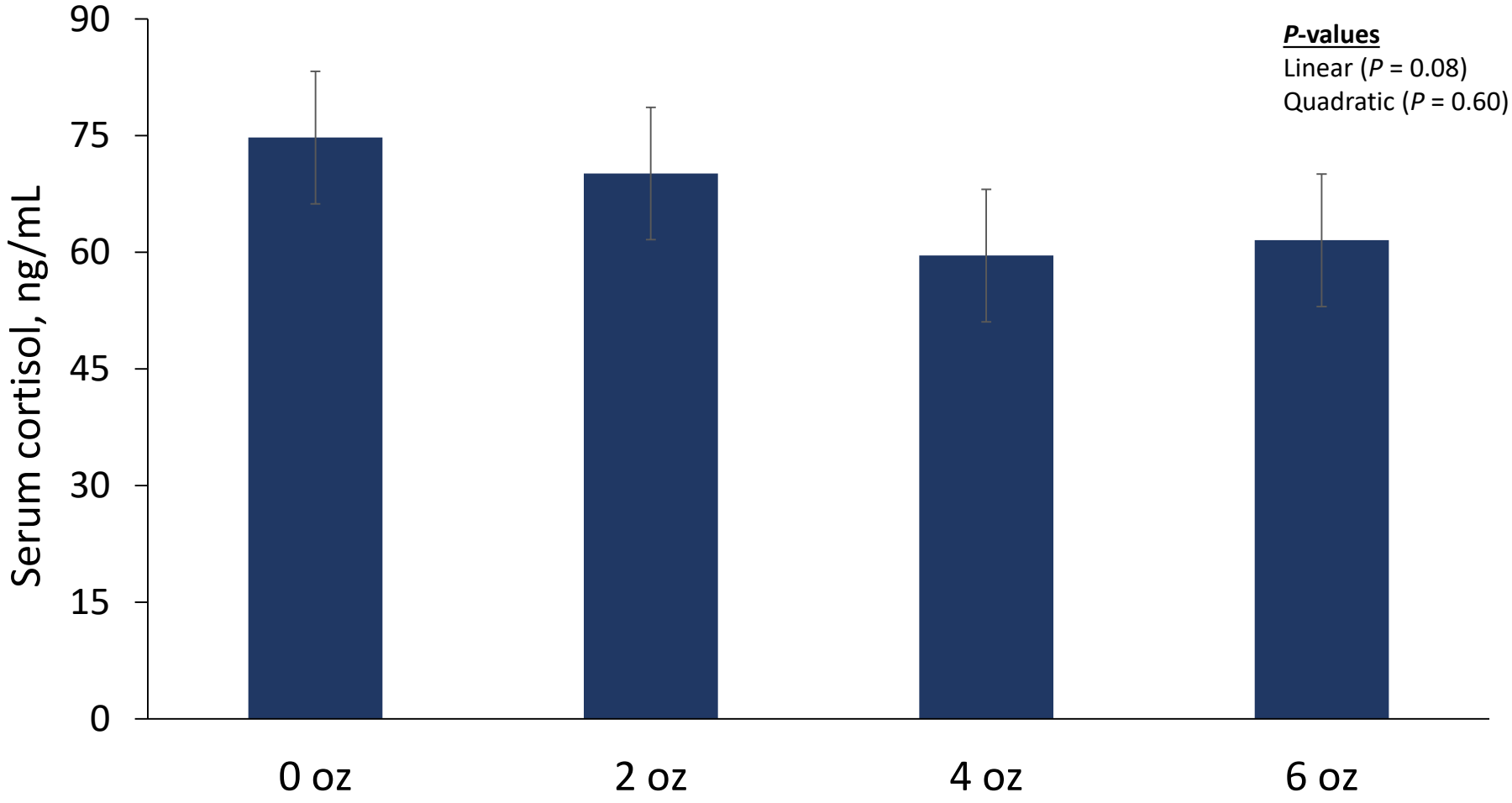
Sources: NRC (2001); Antaya et al. 2015

Milk iodine increased linearly in organic dairy cows fed kelp meal during the winter season



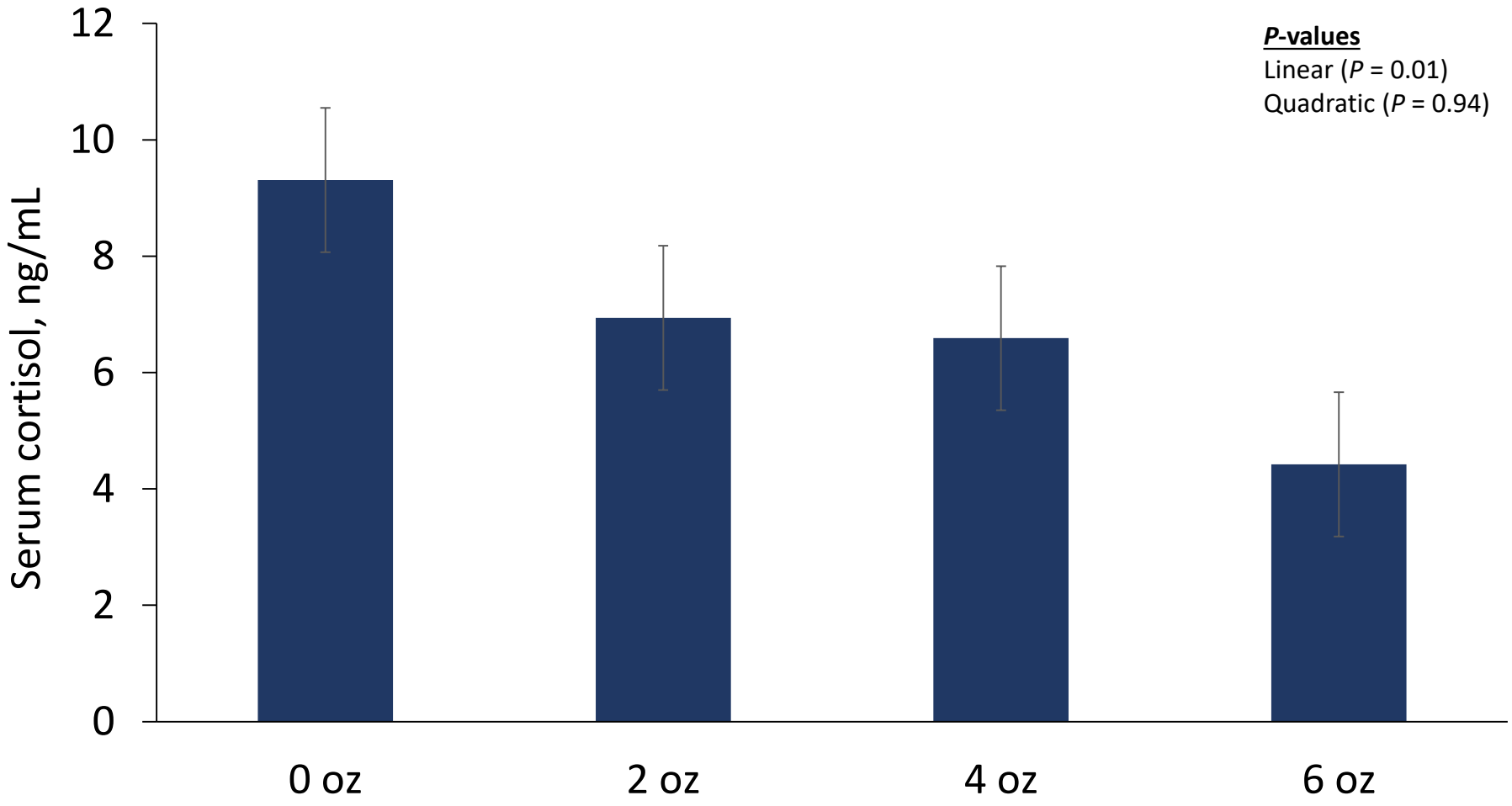
Source: Antaya et al. 2015

Serum cortisol in dairy cows fed kelp meal during the winter



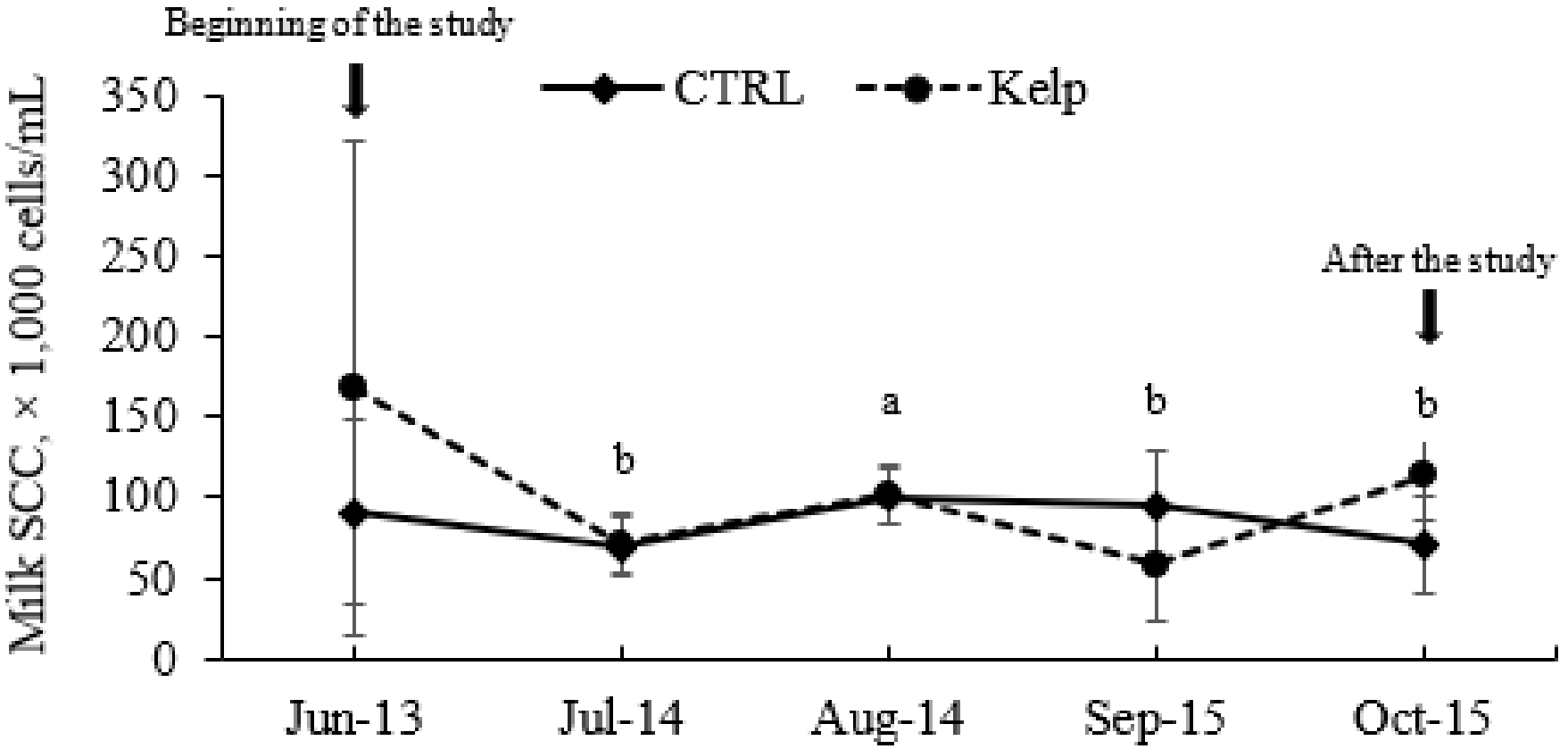
Source: Antaya et al (2015)

Serum cortisol in conventional dairy cows fed kelp meal during the summer



Source: Brito et al. (unpublished)

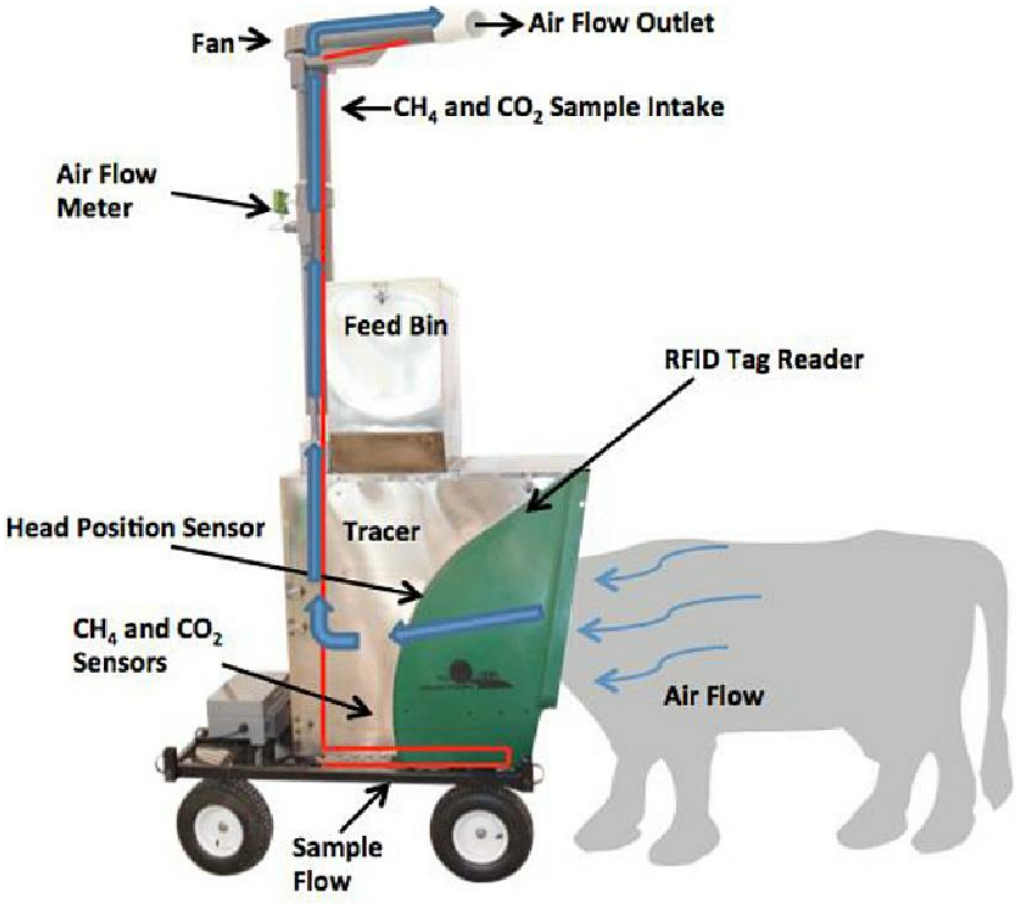
Milk somatic cell count (SCC) in grazing cows fed kelp meal



***P*-values**
Diet ($P = 0.92$)
Month ($P < 0.05$)
Interaction ($P = 0.29$)

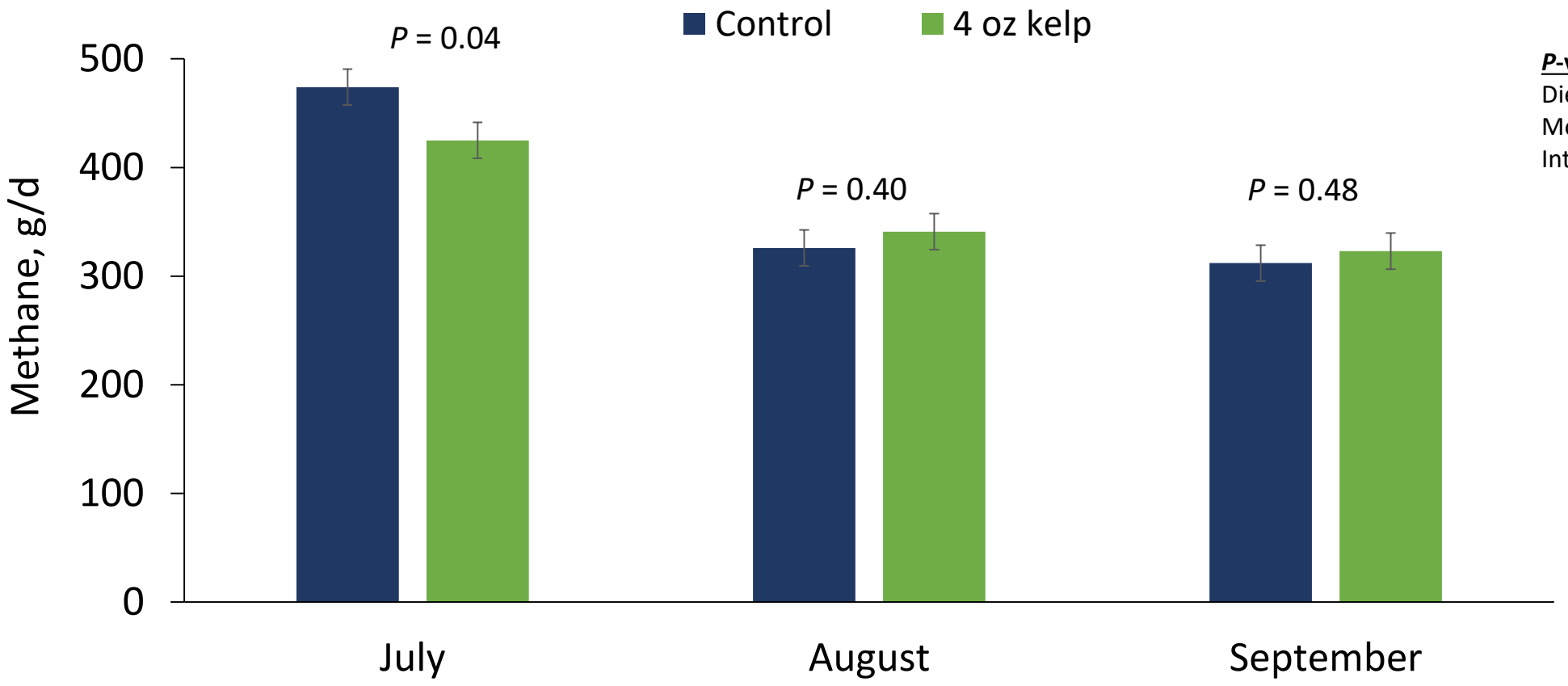
Source: Brito et al. (unpublished)

Methane emission measurements



The portable GreenFeed gas emission monitoring system

Methane emissions in grazing dairy cows fed kelp meal



***P*-values**
Diet ($P = 0.60$)
Month ($P < 0.01$)
Interaction ($P = 0.01$)

Source: Brito et al. (unpublished)

Final considerations

- Kelp meal supplementation may provide farmers with opportunities to improve animal health, but further research is needed
- Kelp meal is a high cost supplement ($50-60 per 50-lb bag)
- There is a critical need for developing a comprehensive evaluation of iodine concentration of retail organic milk

University of New Hampshire

Acknowledgments

University of New Hampshire
College of Life Sciences and Agriculture

SARE
Sustainable Agriculture
Research & Education

USDA NIFA
United States Department of Agriculture
National Institute of Food and Agriculture

Advancing Grass-Fed Dairy: A Whole Systems Approach to Enhancing Productivity, Quality, & Farm Viability in the U.S.

(Project no. 2018-02802)

Project Collaborators

Dr. Heather Darby, Agronomist and Nutrient Management Specialist, University of Vermont Extension

Brent Beidler, Grass-fed dairy farmer, VT

Dr. Sidney Bosworth, Professor and Agronomist, University of Vermont Extension

Dr. André F. Brito, Associate Professor Organic Dairy, University of New Hampshire

Roy Desrochers, Sensory Practice Leader, Tufts University Sensory and Science Center

Sarah Flack, Grazing Livestock Specialist, Sarah Flack Consulting, VT

Dr. Sabrina Greenwood, Associate Professor of Animal Science, University of Vermont

Dr. Jana Kraft, Associate Professor of Animal Science, University of Vermont

Dr. Meredith Niles, Associate Professor of Food Systems, University of Vermont

Albert Robbat, Jr., Director, Tufts University Sensory and Science Center

Dr. Kathy Soder, Animal Scientist, USDA-ARS-Pasture Systems and Watershed Management Research Unit, PA

Sara Ziegler, Crop and Soil Coordinator, University of Vermont Extension

Previous Grass-fed Dairy Research

2016 Northeast **SARE** grant created the Grass-fed Monitor, a monthly preliminary benchmarking program in the Northeast

2017 **FAFO** provided support for additional outreach materials and forage variety trials

2018 **NERME** grant to add DHIA milk testing and herd record information to the Grass-fed Monitor

LNE16-345

NORTHEAST SARE Sustainable Agriculture Research & Education

ORGANIC VALLEY

FARMERS ADVOCATING for ORGANIC

NORTHEAST EXTENSION RISK MANAGEMENT EDUCATION

The new OREI project will include:

- Objective 1: Understand the economic and production metrics for grass-fed dairy systems through implementing benchmarking on farms throughout the U.S.

- Objective 2: Understand nutrient cycling dynamics and the subsequent impacts on crop, soil, and animal production and health

- Objective 3: Investigate the impacts of soil and forage management on nutrient cycling, forage production, forage quality, and farm economics

- Objective 4: Develop an understanding of market demands and potential for grass-fed market growth and expansion

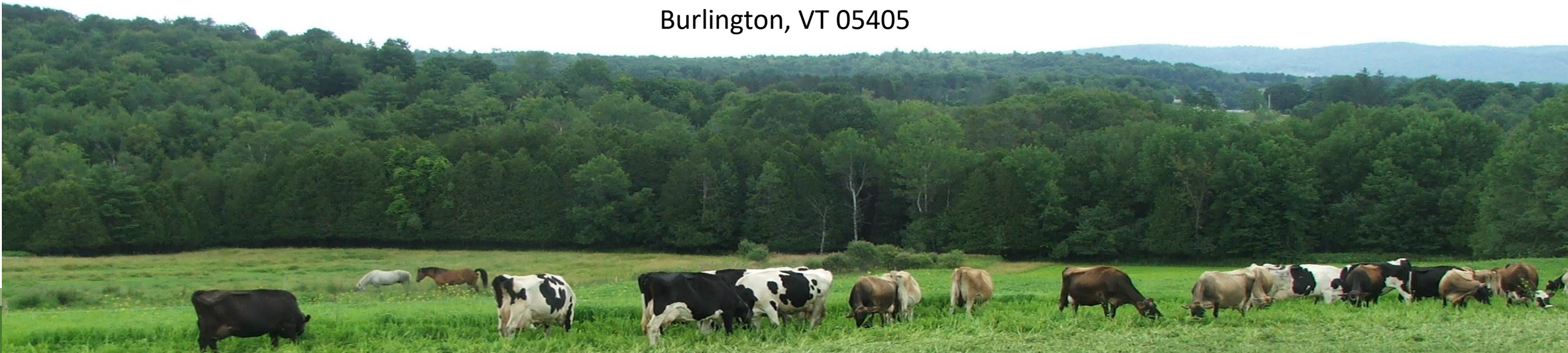
- Objective 5: Strengthen knowledge, skills, and networks among farmers, processors, and technical service providers

A survey has just been sent to all 100% grass-fed dairies in the U.S.

If you are a 100% grass-fed dairy interested in receiving the survey that processes milk on-farm or sells directly to an end user please send your contact information to:

mtniles@uvm.edu or mail it to:

Meredith Niles
University of Vermont
Department of Nutrition & Food Sciences, 350 Carrigan Wing
109 Carrigan Drive
Burlington, VT 05405



Grass-Fed Benchmark Program

- Will continue for the next 4 years.
- Will be expanded in Northeast & beyond
- For farmers in the Northeast:
  - Will have opportunity to continue on DHIA;
  - Will have opportunity to participate in cost of production;
  - Will have opportunity to participate in other research.

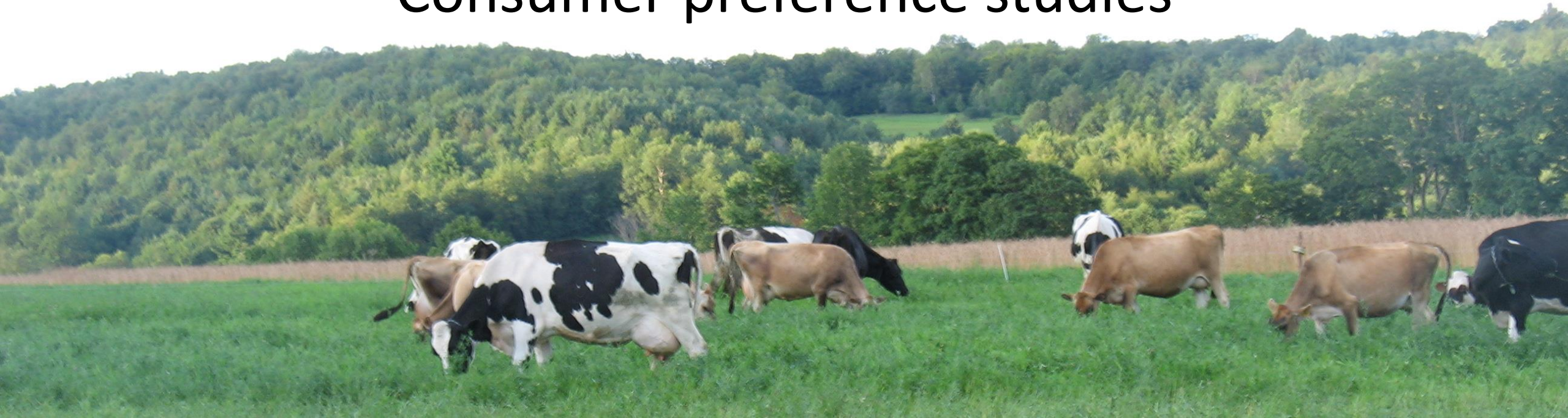
Other Research

MUN research in PA/NY

Forage quality research in VT

Nutrient cycling research NY/VT

Consumer preference studies



BEDDING STRATEGIES THAT PROMOTE UDDER HEALTH AND MILK QUALITY BY FOSTERING A BENEFICIAL MICROBIOME ON ORGANIC DAIRY FARMS

A research and extension project funded by the
USDA Organic Research and Extension Initiative

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Despite living on a giant pile of organic material mixed with their own manure and urine, cows on bedded pack do not necessarily experience more mastitis.

In fact, some research reports a decrease in mastitis after switching to bedded pack.

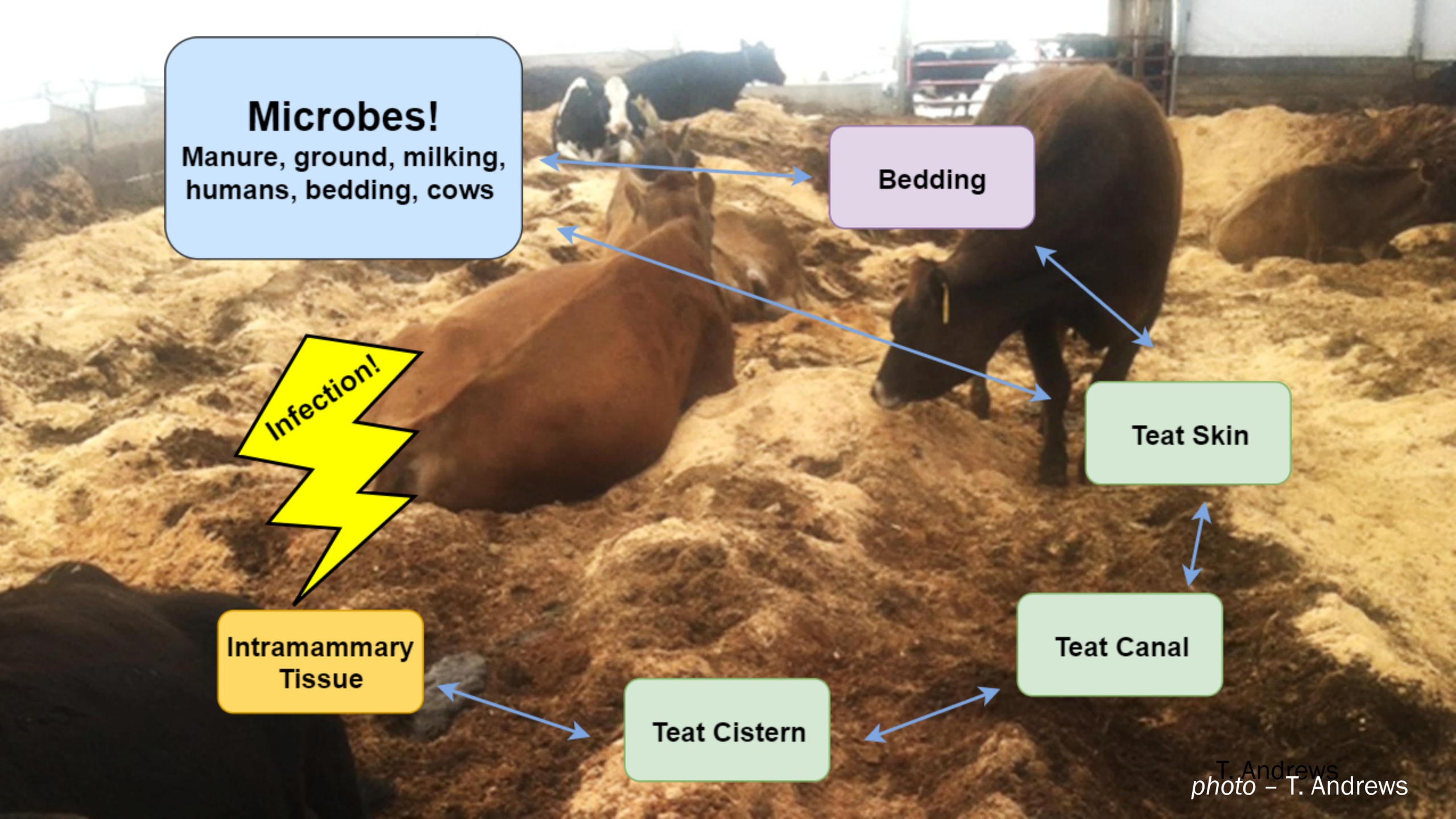

photo – T. Andrews

- How does bedding management influence mastitis and milk quality on organic farms?
- What bacteria and fungi are living in bedding, milk, and cow mammary skin on organic farms?
- Do these organisms have an effect on mammary health?
- Does bedding management change this community?

Questions?

photo - J. Colby