Poster Paper Break Session

Between Session 3 and Session 4, an hour-long poster paper session was held while people had access to refreshments. The poster paper session informs stakeholders about ongoing Regional research and education projects. This year's 15 poster papers were the most that we have had at a single Conference and covered many diverse topics: the efficacy and accuracy of in-field brix measurements on forage crops, production management practices on organic grass-fed dairy farms, updating the pasture condition scoresheet, the implications of mob and rotational grazing systems on plant diversity along with forage yield and quality, evaluating compaction BMP effects on soils, environmental assessments of grass-based dairy production, soil carbon storage in pastures, using a grazing chart as a planning and monitoring tool, evaluating water quality BMPs in the Chesapeake Bay Watershed, prebiotic effects on health-promoting dairy bacterial cultures, and converting low-grade sheep wool into pellets that can be used as a slow-release nitrogen fertilizer for vegetable farms. Fourteen abstracts of these papers are presented below.

Livestock Management

Survey of Production Management Practices on Organic, Grass-Fed Dairy Farms in the United States

M.A. Snider*[1], S.E. Ziegler[2], H.M. Darby[2], K.J. Soder[3], A.F. Brito[4], B. Beidler[5], S. Flack[6], S.L. Greenwood,[1] and M.T. Niles[§7]

[1]Department of Animal and Veterinary Sciences, University of Vermont, Burlington, VT 05405
[2]University of Vermont Extension, University of Vermont, St. Albans, VT 05478
[3]USDA-ARS Pasture Systems and Watershed Management Research Unit, Curtin Road, University Park, PA 16802
[4]Department of Biological Sciences, University of New Hampshire, Durham, NH 03824
[5]Beidler Family Farm, Randolph, VT 05061
[6]Sarah Flack Consulting, Enosburg Falls, VT 05450
[7]Department of Nutrition and Food Science, University of Vermont, Burlington, VT 05405
[§]Corresponding author: mtniles@uvm.edu

During the last decade, organic dairy production has rapidly grown in the United States with the consumer market for organic milk growing from 1.9% to 5.0% of total milk sales. However, many organic dairy producers are currently facing economic challenges due to the fluctuating milk market and a decline in milk prices. This, as well as personal philosophy and a need for sustainability, has led some organic producers to shift towards grass-fed dairy production and the grass-fed milk market, which is growing faster than many other dairy sectors. Demographic and management data regarding organic dairy production have previously been reported, but there is a

*Presenter

lack of research outlining commercial use of grass-fed organic dairy production practices and producer-identified research needs. The objectives of this study were to 1) assess information regarding current production practices, including herd health, economic data, milk production, and producer knowledge on grass-based dairy farms, and 2) identify areas of research and outreach to advance the organic, grass-fed dairy industry across the United States via survey methods.

A survey questionnaire was mailed to 351 grass-fed dairy farms throughout the United States. Producers were asked to report on farm characteristics and demographics, forage and animal production practices, and producer perceptions regarding management practices. The survey response rate was 46.7% with the majority of respondents farming in NY, OH, WI, PA, and VT; the remaining farms were located in IA, MD, VA, OR, MN, NH, MA, FL, KS, NJ, and IN. Surveyed producers were an average age of 47.6 years old, 10 years younger than the national average. Over 60% of respondents reported that they identified as part of the plain community, correlating with the percentage of producers that indicated that they never utilize technology on the farm.

The average farm consisted of 219 acres of pasture and an average herd size of 49 cows: equating to 4.47 grazed acres per mature dairy cow. In total, 63% of producers reported needing to purchase additional forages; this indicates that the estimated average 4.47 acres per cow is not producing all necessary forage. Most farms (96.3%) reported that they have been certified organic for an average of 10.3 years and grass-fed (84.2%) for 5.1 years. The majority of producers reported utilizing grazing systems in which cattle where moved to new paddocks twice or more daily with an average of 197 grazing days per year (minimum 140 d – 360 d); this wide range is most likely dependent on geographic location. Producers that indicated that they were at least satisfied with their milk production (71.8%) also indicated a high level of knowledge in understanding forage quality test results, growing higher energy forages, and strategies for improving forage quality. These same producers indicated that on a scale of very unsatisfied to very satisfied, they were at least somewhat satisfied with pasture qualities, such as soil health, forage quality, and yield. From these perceptions and demographic data, needs for additional research identified include creating financial and production benchmarks to help expand adoption and marketing of grass-fed production systems and products.

Assessing the efficacy of in-field brix measurements for forage sugar and energy content

Eric D. Billman*[1], Kathy J. Soder[1], Jeff Horst[2], Kristi Balk[3], and Aimee N. Hafla[4]
[1]USDA-ARS, Pasture Systems and Watershed Management Research Unit, Building 3702 Curtin Road, University Park, PA 16802-3702
[2]Laboratory Production Manager, Agri-King, Inc., Fulton, IL
[3]Laboratory Production Assistant, Agri-King, Inc., Fulton, IL
[4]Beef Nutritionist, Agri-King, Inc., Fulton, IL

In recent years, some dairy and livestock producers have been using Brix refractometers, which

*Presenter

measure the refractive index of dissolved solids, to provide an estimate of forage sugar and energy content without needing to rely on expensive laboratory testing. However, little validation of the Brix Index has been conducted in forage crops, leading some to question the efficacy of the system for forages. The objective of this study was to compare and validate Brix readings with wet chemistry values, and determine if the Brix Index is a reliable way to assess forage sugar content. Four sampling periods occurred on a 25 - 30-day basis between May and August 2019. At each sampling, eight alfalfa and orchardgrass samples were collected, with three Brix readings per sample measured on a digital Brix refractometer. Samples were flash-frozen, freeze-dried, and analyzed via wet-lab analyses for total and individual sugar concentrations and nutritive value (Agri-King, Inc., Fulton, IL). Brix values were correlated with lab analyses in SAS 9.4. Brix values were either: a) negatively correlated ($P < 0.01$) to wet-lab analyses of total sugars (-0.65), glucose (-0.64), and fructose (-0.68) in orchardgrass, or b) not correlated ($P > 0.2$) to total sugars, glucose, and fructose in alfalfa. Conversely, Brix values of both orchardgrass and alfalfa were positively correlated ($P < 0.01$) to NDF (0.57 – 0.58) and hemicellulose (0.42 – 0.55), along with ADF of alfalfa (0.54). There was no correlation between Brix values and commercially-used metrics for forage quality, including TDN, RFV, and RFQ. These findings indicated that the Brix index is not a reliable way to assess the sugar content of forages. Producers should consider more accurate methods of analysis for assessing energy content of pastures.

Pasture Management

Updating the Pasture Condition Score

Sarah Goslee*, Ecologist, USDA-ARS, Pasture Systems & Watershed Management Research Unit, 3702 Curtin Road, University Park, PA 16802-3702

The original Guide to Pasture Condition Scoring, written by Dennis Cosgrove, Dan Undersander, and James Cropper, and published by the NRCS in May 2001, has been used intensively nationwide. While the ten indicators in the original guide remain useful, practical experience has shown that some aspects could be revised to improve the applicability of the pasture condition score across the full range of pastures found in the US, and to ensure that the indicators can be consistently applied in the field. This revised guide, produced by NRCS and ARS personnel working together, merges scientific accuracy and practical reliability to ensure the best possible tool for understanding the condition of the nation's pasture resources.

Mob & Rotational Grazing in the Northeast: Diversity, Yield, and Quality Implications

Eric D. Billman*[1], Jessica A. Williamson[2], Kathy J. Soder[1], and Danielle M. Andreen[2]
[1]USDA-ARS, Pasture Systems and Watershed Management Research Unit, Building, 3702 Curtin Road, University Park, PA 16802-3702
[2]Assistant Professor of Forage Management and Graduate Research Assistant, Department of Plant Science, Penn State University, University Park, PA

*Presenter

Introduction of novel grazing management systems has the potential to significantly alter pasture species composition, productivity, and forage quality. This is due to forage crops that may not be adapted or well-suited to increased or reduced grazing frequency and intensity. Mob grazing, a system developed in the western United States, has been rising in popularity over recent years, but has yet to be assessed for forage production systems in the Northeast. The objective of this research was to compare changes in species diversity, yield, and forage quality between a mob grazing system (MOB) and a traditional rotational grazing system (ROT) for the region. Eight, 0.10-ha plots were established in 2014 as a randomized complete block with four replications, and seeded with alfalfa (*Medicago sativa* L.), white clover (*Trifolium repens* L.), orchard grass (*Dactylis glomerata* L.), narrowleaf plantain (*Plantago lanceolate* L.), and tall fescue [*Schedonorus arundinaceus* (Schreb.) Dumort]. Mob-grazed (MOB) plots were grazed twice year^{-1}, (70 – 90-day interval), and rotationally-grazed (ROT) plots were grazed four to six times year^{-1}, (when sward height reached 25 cm). At the conclusion of four years, alfalfa stands were 30% greater ($P < 0.01$) under MOB than ROT, and forage grass stands were 10 - 60% greater ($P < 0.01$) under ROT, depending on species. The different management systems also resulted in significantly greater yield ($P < 0.01$) in the MOB systems at individual harvests, but greater cumulative annual yield under ROT. Finally, forage fiber quality was less desirable under MOB grazing, with greater ($P < 0.01$) ADF and lignin concentrations. These results suggest that ROT may be more well-suited for northeastern grazing systems, as it provides a benefit to forage quality and cumulative yield per year, but that MOB grazing may be more desirable if the larger per-harvest biomass can be efficiently used by livestock.

Evaluating compaction BMP effects on soil properties and demonstration of soil moisture monitoring for compaction prevention in heavy clay soils of the Northeast

Joshua Faulkner[1], Juan Alvez*[2], Josef Gorres[3], Kristin Williams[4]

[1]Adjunct Assistant Professor, Department of Civil & Environmental Engineering, Farming and Climate Change Program in the UVM Extension Center for Sustainable Agriculture
[2]Extension Research Associate, UVM Extension Center for Sustainable Agriculture, Pasture & Livestock Program
[3]Associate Professor, Department of Plant & Soil Science, College of Agriculture & Soil Science
[4]Agronomy Outreach Professional, Champlain Valley Crop, Soil and Pasture Team, Middlebury, VT, University of Vermont, Burlington

Soil compaction can be a significant yield-limitation and conservation concern due to poor drainage, increased runoff, reduced soil aeration, and decreased root penetration. The compaction problem is common, especially in cool, humid regions with heavy clay soils, such as the Northeast. To remediate deep compaction, producers often employ deep tillage, or subsoiling, in an effort to loosen soil to reduce bulk density and allow for deeper root penetration and improved perco-

*Presenter

lation of soil water. Management practices that involve less soil disturbance, such as cover cropping, or rotational grazing have also been suggested and are being used as approaches to remediate and prevent compaction by improving overall soil health and 'bio-drilling'. This project also established a soil moisture monitoring network in a rotational grazing system that could be remotely monitored by the farmer in real-time to guide herd management for compaction prevention over a two-year period.

The goal of this project was twofold: (1) to monitor overall soil health and penetration resistance associated with various biological and mechanical compaction alleviation methods; and (2) to monitor the impact of biological and mechanical compaction alleviation methods on ability of compacted soil layers to transmit water. We evaluated mechanical (i.e., deep tillage) and biological (i.e., cover crop mixes 1-3) approaches to compaction remediation in pasture/hay systems in two Vermont farms over three years. Treatments were completely randomized within three blocks in two farms with Vergennes and Covington Clay soils. When we performed the same analysis adjusted by LSD, under depth class 0-4 inch, it yielded further differences on year 3, on HH farm, as follows: Mix 3 was more advantageous than K-L, Mix 1 and Mix 2 ($p=0.034$, $p=0.012$ and $p=0.016$ respectively). Further, the following treatments differ at PR Farm, on year 3 under depth class 0-4 inch: K-L differed from Control and Mix 2, ($p=0.002$ and $p=0.035$ respectively); Mix 1 differed from Control ($p=0.022$); Mix 3 differed from Control ($p=0.05$).

Climate's Impact on Species Adaptation

The USDA Northeast Climate Hub: A Regional Source for Adaptation Information

Curtis Dell*[1], David Hollinger[2], and Erin Lane[2]

[1]USDA-ARS, Pasture Systems and Watershed Management Research Unit, Building, 3702 Curtin Road, University Park, PA 16802-3702
[2]USDA-Forest Service, Northeast Regional Climate Hub, 271 Mast Road, Durham, NH, 03824-0640

Changing rainfall and temperature patterns and the probability of a greater frequency of extreme weather events with a changing climate presents increasingly greater challenges for farmers, foresters, and other land managers. While a wide range of currently available information sources, technologies, and conservation practices are available to help producers adapt to our changing climate, finding the right approach to address commodity-specific local issues can be difficult. The USDA Northeast Climate Hub works across USDA agencies and with partner universities to help provide land managers with the information they need to address those challenges in the Northeastern US. The poster highlights the climate adaption information products available through the Northeast Hub including vulnerability assessments, adaptation workbooks for crop production and forestry, factsheets summarizing research findings, and the "As If You Were There" video series on adaption approaches for a range of commodities and locations.

*Presenter

Educational & Technical Assistance Programs

Grazing Guide

Sarah Goslee*, Ecologist, USDA-ARS, Pasture Systems & Watershed Management Research Unit, 3702 Curtin Road, University Park, PA 16802-3702.

The Consortium website (http://grazingguide.net) presents NEPC information and newsletters, research and extension updates organized by state and by keyword, and a calendar of events. Reference material includes short-, medium-, and long-term weather forecasts, updated daily, and the second edition of the book, Pasture Plants of the Northeastern US. The Grazing Guide has space for photos and videos, and can be found on Facebook and Twitter (and soon Instagram). We invite you to submit photos, research and farm reports, and upcoming events. What else would you like to see?

Grazing Charts

Troy Bishopp*, Regional Grazing Specialist (East) at Upper Susquehanna Coalition, 851 Chemung St., Horseheads, NY.

Environmental Assessment of Grass-Based Dairies

An Environmental Assessment of Grass-Based Dairy Production

C. Alan Rotz*[1], Michael Holly[2], Arron de Long[3], Franklin Egan[3] and Peter J.A. Kleinman[1]

[1]USDA-ARS, Pasture Systems and Watershed Management Research Unit, Building 3702 Curtin Road, University Park, PA 16802-3702
[2]Mechanical Engineering Department, University of Wisconsin–Green Bay, Green Bay, WI 54311
[3]Pennsylvania Association for Sustainable Agriculture, Harrisburg, PA 17102

We compared all-grass, grass supplemented with grain, and full confinement dairy production systems using a whole-farm model and found that for many environmental sustainability indicators, the grass-based systems had smaller environmental impacts per unit of farmland but larger impacts per unit of milk produced compared to confinement fed systems. Grass-based dairy production, which relies heavily on grazing and use of forage crops, is growing primarily due to reported human health benefits of the milk produced and perceived environmental and animal welfare benefits. Data and information on production practices were gathered from eight dairy farms in Pennsylvania. Four of the farms grazed and fed only forage, and four supplemented the forage with some grain. From the information obtained, each farm was simulated with the Integrated Farm System Model to verify proper representation of their production practices. Due

*Presenter

to variation in climate, soil characteristics and management practices, a comparison of the two grass-based farm types showed no significant differences in environmental impacts. Farms of the same size using each production strategy along with a more traditional confinement fed production system were then simulated using the same climate and soil conditions for a better comparison. Predicted nitrogen and phosphorus losses to the environment, fossil energy use, water use, and greenhouse gas emissions were less from the grass-based farms compared to the confinement operation. Due to lower milk production on the grass-based dairy farms, nutrient losses and greenhouse gas emissions expressed per unit of milk produced were generally greater than those of the confinement system. Within the grass-based dairy systems, the system that supplemented with grain had slightly lower nitrogen and phosphorus losses per unit of farmland compared to the grass-only system, and much lower losses and emissions when expressed per unit of milk produced. Total production cost was less for the all-grass dairy than the grass with grain dairy. With a greater milk price, the all-grass system provided greater profitability per unit of land used and per unit of milk produced compared to the confinement farm of similar size. These data indicate that grass-based dairy farms can provide environmental benefits to a local water-shed, but due to a lower efficiency in milk production, they may increase the aggregate environmental impacts of regional and global supply chains.

Implications of Soil Carbon Storage in Pastures

Soil organic matter and its role in building and maintaining healthy pastures

Curtis Dell*, Research Soil Scientist, USDA-ARS, Pasture Systems and Watershed Management Research Unit, Building, 3702 Curtin Road, University Park, PA 16802-3702

Increasing soil organic matter (SOM) has been seen as a means to sequester atmospheric carbon and reduce concentrations of greenhouse gases linked to climate change. While maximizing sequestration of carbon in soils still remains a worthwhile goal, the recent emphasis on soil health has helped to stress the critical role for soil organic matter. Organic matter is the primary soil characteristic that we can improve with management, and it influences a wide range of soil functions and properties. Organic matter is a slow release source of nutrients and improves the soil's capacity to retain nutrients. Soil structure is also improved as SOM increases, improving water and air movement. In addition, SOM typically increases the plant-available water holding capacity of a soil. Lands that have been in long-term (25 yrs. plus), well-managed pasture have typically reached an equilibrium point where SOM content is high, but stable. However, conversion of croplands to pasture and renovation of poorly maintained pasture usually results in a large increase in SOM for several years. While established pastures typically do not accumulate additional carbon, it is critically important to recognize the value of the SOM currently maintained in our pasture soils. This SOM is critical for sustaining forage productivity with limited external inputs, and it represents a large pool of stored carbon that would otherwise be found as atmospheric carbon dioxide.

*Presenter

Evaluating Water Quality Best Management Practices in the Chesapeake Bay Watershed

Evaluating Nutrient Management Approaches to Reduce Nutrient and Sediment Runoff from Dairy Farms in Central PA

Ryan Barnes*[1], Heather E. Gall[1], John E. Watson[2], C. Alan Rotz[3], Herschel A. Elliott[1]

[1]Department of Agricultural and Biological Engineering, College of Agricultural Sciences, Pennsylvania State University, University Park, PA 16802
[2]Department of Ecosystem Science and Management, College of Agricultural Sciences, Pennsylvania State University, University Park, PA 16802
[3] USDA-ARS, Pasture Systems and Watershed Management Research Unit, Building 3702 Curtin Road, University Park, PA 16802-3702.

The Chesapeake Bay is the largest and most diverse estuary in the United States. Since the 1960's, the health of the Bay has declined due to excess nutrient and sediment loads, largely from agricultural activities, resulting in large losses of aquatic habitat, wide-spread eutrophication, and hypoxic zones. In 2010, the Environmental Protection Agency established the Total Maximum Daily Load (TMDL) to limit nutrient and sediment discharges to the Bay by 2025. Currently, state conservation programs in Pennsylvania (PA) are actively promoting adoption of riparian buffers to meet TMDL goals. However, given the extensive maintenance that buffers require, this may not be the most appropriate best management practice (BMP), particularly for dairy farmers who are facing significant economic challenges. We evaluated potential benefits and tradeoffs for commonly adopted BMPs in the Bay watershed, including riparian buffers, streamside fencing, cover crops, and manure storage. We developed nine representative dairy farm operations for Mifflin County and conducted simulations using the Integrated Farm System Model (IFSM) to compare nutrient runoff and economic feasibility for each of the BMP adoption scenarios. The nine farms include confined, organic, and Amish farming practices for dairy herds ranging in size from 35 to 150 cows. Results will be shared directly with farmers and landowners in the study county through extension workshops to help inform adoption of the selected BMPs of interest. Further, the results may help inform policies for implementing BMPs on dairy farms across the Chesapeake Bay watershed to help meet the 2025 TMDLs.

Macroinvertebrate Sampling of Halfmoon Creek

Partnership Between Penn State ASM/ERM 309 "Measurement & Monitoring of Hydrologic Systems", Chesapeake Bay Foundation, Centre County Conservation District, and USDA-Agricultural Research Service

Our class partnered with the Chesapeake Bay Foundation (CBF) and a local landowner to better

*Presenter

understand hydrology and water quality in the Halfmoon Creek watershed. When water samples are collected to assess water quality, they represent the quality of the water only at the time the sample was collected. However, macroinvertebrates that use the stream as their habitat can serve as an integrator of water quality over longer periods of time. We conducted a macro-invertebrate assessment at a location in Halfmoon Creek that has been restored with a forested riparian buffer. Buffers help to improve water quality by filtering nutrients and sediment in surface runoff, stabilizing the streambank, and shading the stream. Our macroinvertebrate assessment contributed valuable knowledge to CBF and the landowner, who is a fly fisherman and passionate about stream health.

Continuous Hydrologic Monitoring in Halfmoon Creek Watershed

Partnership Between Penn State ASM/ERM 309 "Measurement & Monitoring of Hydrologic Systems", Chesapeake Bay Foundation, Centre County Conservation District, and USDA-Agricultural Research Service

The Chesapeake Bay has been degraded by excess nutrients and sediment, in part due to agricultural activities, for decades. To improve water quality across the Bay watershed, partnerships among a wide range of stakeholders are critical. Our class partnered with the Chesapeake Bay Foundation (CBF) and a local landowner to better understand hydrology and water quality in the Halfmoon Creek watershed. We generated continuous hydrologic data at two locations, including water level, rainfall, air temperature, water temperature, and dissolved oxygen concentration, for two months during the Fall semester. These data will be utilized by CBF, as well as the USDA and the Centre County Conservation District, to help determine appropriate best management practices to improve water quality locally and in the Chesapeake Bay.

Finding Marketable By-Products from Pasture-Raised Livestock

Early Findings on Wool Pellets as a Fertilizer for Vegetable Farms

*Kimberly Hagen, Grazing Specialist, Center for Sustainable Agriculture, UVM Extension, University of Vermont, Burlington Vt.
Susan Hodgson, Agriculture Outreach Specialist, Center for Sustainable Agriculture, UVM Extension, University of Vermont, Burlington, Vt

Kimberly Hagen and Suzy Hodgson of the Center for Sustainable Agriculture were seeking a way to support Vermont's sheep farmers by exploring market options for a use for raw, low-grade wool. A grant from USDA Rural Development, support from the Vermont Agency of Agriculture, Food & Markets, and the partnership and interest of an energetic team of partners made it possible to explore a range of options.

*Presenter

Originally focused on finding a way to process raw wool to meet demands for local and sustainable materials for the building trade, the group came to realize that a use that would not require scouring (cleaning) was what was most useful and sustainable.

After learning that wool could be "pelletized" - compressed into small dense shapes - the team began investigating the process and potential impact for both sheep and vegetable farmers.

Prebiotic Effects on Health-Promoting Dairy Bacterial Cultures

Growth and Short Chain Fatty Acid Production by Potential Probiotic Lactobacilli

John A. Renye, Arland T. Hotchkiss*, and Andre K. White.
USDA-ARS, Eastern Regional Research Center, Dairy and Functional Foods Research, 600 E. Mermaid Lane, Wyndmoor, PA 19038

Prebiotics are nondigestible food ingredients selectively used by beneficial bacteria within the colon to improve host health. Inulin and fructo-oligosaccharides (FOS) are well studied prebiotics that can be metabolized by strains of lactobacilli and bifidobacteria; and are associated with improved digestive health in humans due to the production of short chain fatty acids (SCFA). Prebiotics have also been shown to improve the growth, survival and bioactivities of probiotics, which has led to the development of synbiotics, where pre- and probiotics are delivered together to optimize their beneficial activities. In this study, we screened 87 strains of lactobacilli for their ability to grow with inulin (Synergy 1) or FOS (P95) provided as the sole source of fermentable carbohydrates. Growth in modified MRS broth (no glucose) containing 1% inulin or FOS (m/v) was monitored for 24h in a Cytation 5 multi-mode plate reader (BioTeck). Nine lactobacillus strains fermented both prebiotics, reaching an optical density (OD600) ≥ 1.2, including: L. casei (strains: LC3, 441 and ATCC 4646); L. helveticus (strains: 1842 and 1929); L. lactis FARR; L. paracasei subsp. paracasei 4564; L. acididophilus 1426; and L. reuteri 1428. Bifidobacterium breve 2141 was also screened and fermented both prebiotics reaching an OD > 1.6. High-performance liquid chromatography was used to identify SCFAs in cell free supernatants (CFS) from twenty cultures which reached an OD ≥ 0.5. For the nine lactobacillus strains above, the concentration of lactic acid was between 175-206 mM, and L. helveticus 1929 produced the highest concentration of acetic acid (~19 mM). In the presence of FOS, the highest concentrations of propionic (3.9-6.2 mM) and butyric acids (0.9-1.2 mM) were detected in CFS from L. reuteri 1428, L. paracasei ssp. paracasei 4564 and L. plantarum 23115. With inulin, L. acidophilus 1426 and L. delbreuckii ssp. lactis 735 produced the highest concentrations of propionic acid (4.2 mM); and L. acidophilus 1426, L. paracasei ssp. paracasei 4564 and L. plantarum 23115 produced the most butyric acid (1.0 mM). Results from this study are essential to identify lactobacillus strains suitable for the development of synbiotics utilizing FOS or inulin as prebiotics components.

*Presenter