

# Dairy Research Supported by the Ohio Dairy Research Fund since 2016

## Animal Health and Reproduction

**Association Between Metabolic Parameters and Reproduction in Lactating Dairy Cows.** The objectives were to assess the association between plasma concentration of NEFA and metabolic hormones (e.g. insulin and ghrelin) before parturition in dairy cows and to evaluate the association among all these metabolic indicators before calving with the resumption of postpartum ovulations in dairy cows. Plasma concentrations of NEFA were negatively correlated with plasma insulin and ghrelin concentrations, and as its concentration depended on plasma insulin concentration, we suggest that ghrelin could have a lipogenic effect similar to that of insulin but with less strength in prepartum dairy cows. As prepartum cows having low plasma NEFA concentration and increased plasma ghrelin concentration had higher hazard (daily risk) of returning to cyclicity postpartum than their herd-mates, the resumption of postpartum ovulation is associated with the metabolic status of dairy cows before calving. *(Dr. Alejandro Relling)*

**How Intramammary Infection Affects Antibody Concentration in Bovine Colostrum.** 104 Holstein and 89 Jersey cows were sampled to identify paired uninfected and infected quarters that were both located either in the front quarters, or in the rear quarters. An intramammary infection at parturition was associated with only minor reductions in colostrum Brix degree values and did not clearly affect colostrum antibody concentrations relative to uninfected quarters. There was a divergence in how parity affected Brix degrees and antibody concentrations in Holstein and Jersey cows. Generally speaking, increased parity was associated with increased Brix degrees and antibody concentrations for Holstein cows, but the opposite was observed for Jersey cows. The observed variability in colostrum antibody concentrations and Brix degrees that exist between quarters within the same cow is not largely affected by intramammary infections and other factors influence this variability. *(Dr. Benjamin Enger)*

**Prepartum Administration of Internal Teat Sealants in Dairy Heifers and Their Effect on Intramammary Infection Risk.** 270 heifers had one quarter assigned to receive teat sealant (TS) 75 days (d) prepartum, one quarter to receive teat sealant 35 d prepartum, and thus the remaining two quarters were untreated. Quarters that received TS were sampled prior to TS administration to estimate prepartum intramammary infection (IMI) prevalence. At 75 d prepartum, 26% of the sampled quarters were infected while 28% of sampled quarters were infected 35 d prepartum. The predominate causative pathogens were non-aureus staphylococci (often regarded as coagulase negative staphylococci). Administration of internal TS decreased the odds of a quarter being infected at calving. Quarter level IMI prevalence at calving was 10% for quarters that received TS but 30% for quarters that did not receive TS. Control quarters were three times more likely to be infected at calving than quarters that received TS at 75 d prepartum and 2.5 times more likely to be infected than those treated at 35 d prepartum. Therefore, aseptic administration of TS prepartum can reduce IMI prevalence at calving. *(Dr. Benjamin Enger)*

## Calf Management

**Effect of *Saccharomyces cerevisiae* Fermentation Products in Bottle-Fed Dairy Calves.** 80 dairy heifer calves were included in the study from birth until weaning at day 60. The two groups were control and supplemental (*Saccharomyces cerevisiae* fermentation products with 1g/head/day of SmartCare (Diamond V®) in the milk and 0.7% on dry matter basis of NutriTek (Diamond V®) on the starter feed). There were no effects on intake, calf performance and blood immunoglobulin G, glucose or insulin. Diarrhea incidence was similar for the two groups. Fecal bacteria count (*E. coli* and *Salmonella*) at day 30 and gut permeability were similar for the groups. *(Dr. Alejandro Relling)*

**Evaluation of the Use of Automated Milk Feeding Systems in Ohio.** 19 dairy farms were traced in Ohio using automated milk feeding (AMF) systems, varying between 1 to 8 units per farm. Generally, death rate was less than 5% within 48 hours after birth. 86% agreed that umbilical and joint infections were not as prevalent as scours and respiratory problems. Scours occurred more in the summer, while respiratory issues occurred more during winter. More than 50% of calves were treated at least once with antimicrobials. A variety of products from only hot water and detergents to hot water, detergent, disinfects and sanitizers were found to be used for cleaning. Frequency of changing nipples and hoses was quiet variable. Swab samples at four areas of the AMF revealed that all farms in all locations of the equipment had environmental organisms (e.g. *Escherichia coli*) present. Stocking density ranged from 15 to 25 calves per pen, and many of the calves were exposed to moderate to severe heat stress during summer. *(Dr. Luciana da Costa)*

**Training Ohio Dairy Farm Managers and Extension Agents on Dairy Calf Health Scoring.** A workshop held in coordination with an Ohio veterinary clinic was conducted in March 2019. 15 calf managers and caretakers participated in the day long workshop. The workshop included presentations on a calf health scoring system, colostrum management, and vaccination protocols. Approximately two hours was spent on a local dairy farm with hands-on practice with scoring calves. Overall, the workshop increased participants' familiarity and comfort-level with the Wisconsin Calf Health Scoring Chart. The majority of participants strongly agreed that they planned to implement the scoring chart on their farm and that they found the workshop to be valuable. *(Dr. Monique Pairis-Garcia)*

## Manure and Nutrient Utilization

**Increasing the Nitrogen Content of Dairy Manure for the Purpose of Providing Side-dress Nitrogen for Corn.** The results of corn plot research in this study indicates that liquid dairy manure, enhanced with 28% urea ammonium nitrogen (UAN), can be used to side-dress corn as a replacement for commercially purchased fertilizer. The use of liquid manure to side-dress corn can provide a new window of time for manure application in Ohio and apply manure when the nutrients could be more fully utilized by a growing crop. If a frac tank is used with manure application, the 28% UAN could be added to the manure in the tank. Another method could be injecting the UAN directly into the drag hose at the source of the manure. *(Glen Arnold)*

**Improving Dairy Production and Lowering Environmental Impacts from Dairy Manure by Feeding Soybean Meal or Corn Distillers Grains with Monensin.** Feeding reduced fat distillers grains (RFDG) at about 30% of the diet decreased feed intake, energy-corrected milk yield, and milk fat and protein yields. As the experiment progressed, cows fed RFDG experienced further decreases in these responses. Furthermore, the RFDG diet decreased urinary nitrogen excretion but increased urinary and fecal phosphorus and sulfur excretion. Monensin supplementation to the high RFDG diet further decreased feed intake and energy-corrected milk. A high RFDG diet (replacing mainly soybean meal) did not sustain production of cows and may increase environmental concerns with high phosphorus and sulfur excretion. Therefore, 30% of RFDG with and without Monensin in a dairy ration is not recommended. *(Dr. Chanhee Lee)*