

Update: Triple Crown Nutrition is Helping Penn State Undergraduate Students Learn More About Equine Science Research

It's been almost a year since Triple Crown Nutrition decided to make a gift to Dr. Burt Staniar's Equine Research Program at Penn State University. The focus of the gift was twofold. First, to support Dr. Staniar's continued efforts to discover new and valuable knowledge in equine nutrition. Second, to support undergraduate student involvement in Penn State's equine research. Over the last six years, Dr. Staniar has developed the Penn State Equine Research Team (PSERT), a group of approximately 50 undergraduate students interested in learning about and participating in equine science program studies in the Animal Science Department. Below are highlights of the partnership's work and broad findings over the last year.

Ms. Amy Kraus, a junior in the Animal Science major, has been studying molecular differences in urine samples from horses fed high forage or high grain diets. Her objective is to investigate the differences in the context of the large amount of research already being conducted, using a different technique. The technique she is using, metabolomics, is a cutting edge tool that provides researchers a completely new view of how dietary treatments impacts metabolism. Amy found the presence of over 10,000 molecules in her samples, and after months of work, narrowed the list down to a very conservative group of about 10 that are significantly different between the high forage or high grain diets. Early indications find the identified metabolites provide a more precise understanding of how the diets may be influencing the horse's gastrointestinal environment, specifically the metabolism of the microbes that live in the gut. Amy will be publishing this research within the next six months. It is also a part of her honors thesis.

Ms. Danae Oliver, a sophomore in the Animal Science major, is studying volatile fatty acid (VFA) patterns in fecal samples from horses fed high forage or high grain diets. These VFA molecules are a very important energy source for the horse and an indicator of changes in the microbial populations in the equine hindgut. Danae has learned how to extract the VFAs from the samples collected, and has even measured VFAs using one of the gas chromatographs housed in the Department of Animal Science. It's too early to report any diet differences, but the techniques and understanding of gastrointestinal physiology that Ms. Oliver and the students who work with her have learned will be invaluable as they pursue careers in the equine and other animal industries. It is worth noting that many horse owners don't know that the fiber in forages and the VFAs produced as a part of fiber's digestion are main energy sources for the horse.

Ms. Samantha Nissley and Ms. Kira Hydock are pursuing a much more basic, but by no means unimportant, project. They are investigating the best technique to measure the pH of equine fecal material. Measuring the pH of fecal material indicates the relative acidity of the contents of the gastrointestinal tract. If the tract becomes too acidic, the gastrointestinal wall can be damaged and important microbes in the hindgut can die. High grain diets are known to decrease gut pH (a more acidic environment) in horses and cows. But this seemingly simple measurement is done in many different ways by different researchers. Sam and Kira have explored a range of different scenarios using over 400 samples and intend to publish their findings so that future research may be conducted using consistent and accurate pH measurement techniques. This kind of research is important to horse owners and companies like Triple Crown Nutrition because understanding how different diets influence something as fundamental as acidity of the gastrointestinal tract has a much broader impact on the health and performance of our horses.

Triple Crown Nutrition's support of undergraduate research in equine nutrition at Penn State has impacted far beyond the individual students listed here. With each of these projects there are numerous other students who have had a chance to help collect samples, process samples in the lab, learn about the equipment we use, and gain a new perspective on the science behind equine nutrition. Dr. Staniar and Triple Crown are excited to see all of these students advance into careers in agriculture, animal science, and of course our own equine industry. The impact of this collaborative effort will be long lasting. It will benefit our current ability to support horse health and performance through innovation in nutrition, while educating future members of the equine industry.

