2023 USPC Convention

2023 USPC Research Project Fair

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ABSTRACT BOOK

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Individual Literature Reviews

Individual Literature Review #1 (Virtual Fair)

A Review of the Genetic Predisposition to Equine Superficial Digital Flexor Tendinopathy

Abigail G., HB HM/C2 Flat/C1 Eventing, Epona PC (Northeast Region)

The superficial digital flexor tendon plays a vital role in the horse's ability to flex the leg and function. The superficial digital flexor tendon (SDFT) is present in both the fore and hind limbs of the horse and stretches along the back of the horse's leg (LLC, HorseDVM). The SDFT's main role is to aid in stabilization, energy consumption, and support of the fetlock joint (LLC, HorseDVM). The SDFT is a commonly injured tendon in horses (O'Brien et al. 2020). SDF tendinopathy is inflammation of the SDFT and is a serious condition that is lameness-inducing (Berkland et al., n.d.). Symptoms include: moderate to severe lameness, heat, inflammation, and pain to palpation (Berkland et al., n.d.). A genetic predisposition to SDF tendinopathy was identified in the National Hunt Thoroughbred (Tully et al, 2013). Scientists have discovered two SNP (germline single nucleotide polymorphisms) mutations that have been linked to an increased risk of SDF tendinopathy in the National Hunt Thoroughbred. (Tully et al, 2013). The two mutations in the genes, glycoprotein tenascin-C and collagen type V alpha 1 play a significant role in the genetic predisposition to superficial digital flexor tendinopathy (Tully et al, 2013).

References

Berkland, J., Walter, K., & Auwerda, P. (n.d.). *Superficial Digital Flexor Tendinitis | Equine Science*. Iowa State University Extension. Retrieved October 14, 2022, from https://www.extension.iastate.edu/equine/superficial-digital-flexor-tendinitis

Galuppo, L. (n.d.). *Superficial Digital Flexor (SDF) Tendinitis*. HorseDVM. Retrieved October 14, 2022, from http://www.horsedvm.com/disease/superficial-digital-flexor-tendinitis/

O'Brien, C, Marr, N, Thorpe, C. Microdamage in the equine superficial digital flexor tendon. *Equine Vet J*. 2021; 53: 417– 430. https://doi.org/10.1111/evj.13331

Tully, L. J., Murphy, A. M., Smith, R. K., Hulin-Curtis, S. L., Verheyen, K. L., & Price, J. S. (2014). Polymorphisms in TNC and COL5A1 genes are associated with risk of superficial digital flexor tendinopathy in National Hunt Thoroughbred racehorses. *Equine veterinary journal*, *46*(3), 289–293. https://doi.org/10.1111/evj.12134

Individual Literature Review #2 (Virtual Fair)

New Horse Colic Technology: Prevention and Treatment

Victoria Z., D2, Emerald Hills PC (Northwest Region)

Colic is the number 1 cause of fatality in a horse; could it now be possibly solved? "New Horse Colic Technology: Prevention and Treatment" shines a light on this serious issue with stories and explanations on comparisons for past treatments and prevention methods and experimental ones. It poses possible prevention technologies by using AI and wearable equipment and better treatment opportunities/studies that range from blood circulation to gut motility, exploring the hope that horse colic could eventually be eradicated.

Individual Literature Review #3 (Virtual Fair)

EPM Overview

Hailey B., UR, Racine County PC (Lakeshore Region)

EPM (equine protozoal myeloencephalitis) is a neurological disease that strikes horses with seemingly no warning. The symptoms vary greatly from horse to horse as does the success of treatment. Discovered by J.R. Rooney in 1964, EPM is a somewhat newer diagnosable illness. Even so, many advances have been made in both understanding the disease as well as treating it.

In researching this broad topic I've chosen to focus my sources on reputable websites, veterinary encyclopedias, veterinary pamphlets, and personal experience. In the future I might choose to dive into a more specific area of EPM, but in order to gain a better understanding of the disease as a whole I have chosen to organize this paper as an overview.

My findings are baffling and perhaps I have more questions than answers. Why do two horses who present similarly as far as symptoms are concerned have completely different outcomes with the same treatments? Why is EPM more prevalent in certain parts of the United States than others? Why do some horses have obvious neurological symptoms while others have symptoms more related to their behavior and overall demeanor?

While I may not have been able to answer all of these questions I gained a greater understanding of the disease and the challenges both horse owners & veterinarians face as a result of it.

Individual Literature Review #4 (Virtual Fair)

The Horse + Human Connection: Horses as Healers

Adeline T., D3 HM/D2 Flat/D1 Jumping, Fairfield County Hounds PC (Metropolitan Region)

Many equestrians can relate to that indescribable peace and serenity that comes in the presence of a horse. Some credit horses' size, strength or simply the look in their eyes. But what's really going on? When you gaze at your heart horse, what's happening to you that causes these wonderful feelings? This question has been studied in the context of equine-assisted therapy. From miniature therapy horses visiting nursing homes to gentle drafts carrying children with special needs to equine-focused PTSD rehabilitation programs, it's apparent that equine-assisted therapy is on the rise and is changing lives. The question is: why is it effective? Based upon extensive research, including review of clinical studies and research articles, the widely accepted conclusion is equine-assisted therapy can combat a wide variety of physical and mental health conditions, as simply being in the presence of horses can impact much of our bodies, from our brains to our hearts. Many horse owners knew it in already, but it's true: being around horses actually makes us happier, healthier people!

Individual Literature Review #5 (Virtual Fair)

Earth, Wind, and Fire

Kathleen C., B, Diamondback PC (Southwest Region)

I continue to learn, experience, and research the impact Mother Nature has on equine management and riding activities. Many geographic areas where United States Pony Club (USPC) operates are facing changes in the climate, be it hotter, dryer, colder and/or wetter. While experiencing more severe weather such as extended Hurricane and Tornado seasons, the best we can do is try to be prepared for the challenges presented. This project roughly follows the USPC Safety Poster with some amplification and additional information. Starting with USPC guidance and expanding to other electronically based information sources bringing forth the importance of weather predictions and disaster preparedness for equine management. This project provides a summary of available information and products in conjunction with some of my personal experiences and lessons learned.

Purpose: Continue research from last year's project regarding weather and expand to include natural disasters' impact on riding and aspects of equine management.

Research: Literary research on weather conditions and/or disasters.

Hypothesis: Awareness and recognition of weather and disasters should influence preventative or reactive actions for health and safety of riders and horses.

Procedure: Research initiated with Pony Club website with additional sources for specific area and national information and guidance.

Analysis: Exploring weather and disaster phenomenon's unique impacts on horse management.

Conclusion: Being aware of local/specific weather predictions and/or disasters should be a part of planning and execution of USPC activities.

Individual Literature Review #6 (In-Person Fair)

Thoroughbred Breeding & Pedigree Theories & the Science of Genetics
Jenavieve F., C2 HM/C2 Eventing, St. Augustine PC (Delmarva Region)

The book Thoroughbred Breeding: Pedigree Theories and the Science of Genetics shows the differences between selective breeding and the different theories in the equine breeding society. Dr Matthew Binns and Tony Morris, both extremely knowledgeable in the equine field, wrote the book in an article type format, as well as filling the book with detailed illustrations and sketches of the different breeding patterns. The authors provide detailed information about the different chromosomes and an in-depth analysis of the history of different breeding selections. Well-known breeders can use the information and theories presented in the book to produce high quality and efficient breeding.

Selective breeding became associated when Queen Elizabeth started her breeding program. Trying to produce high quality foals for her riding and racing career in the United Kingdom starting in the mid 1900's. Her first foal that she produced was out of the two equines, Hyperion and her other equine Burmese. Her racing was done by her breeding selection of picking the two most experienced horses that had the most stamina build up rather by speed. Queen Elizabeth did most of her breeding from her father's perspective as well as looking into books and articles in her family's library. After looking into more research, Queen Elizabeth's foals ended up being high quality with the stamina build up that her parents had given to the foals. In chapter five it continues to state, "In contrast to the three billion bases of DNA of the chromosomes, the mitochondria contain a small circle of DNA of about 16,000 bases that is inherited only from the mother." Stating that the mother gives a certain number of chromosomes while the father also gives off a certain number of chromosomes while the mothers side is giving off roughly about 16,000 bases. On page 153 in chapter 10 of the book it also states, "During the copying of the DNA when the cells divide, very rare errors are introduced into the DNA sequence, producing mutations, which might be regarded as spelling mistakes in the book of life."

Breeding theories have been around for hundreds of years and were first associated with the Arabs in the early 1800's. The Arabs started to look into breeding theories and how the horses had come out a different color than the parents or how the foal produced dapples or certain facial or leg markings. After years passed and the Arabs looked more into breeding, they figured out that the dapples and other markings had come from mutations in the breeding process. The mutations take place in the equine breeding process and the more mutations an equine has, the better chance of more chromosomes being produced. Within the book, in chapter 16, it states that “It was assumed that the same arrangement for the genes would be found in more complex organisms, but in this case the gene sequences were interrupted by large stretches of DNA sequence called introns, which only rarely seemed to have a useful function.” So,

showing that the book states the more information that will be procced to continue the breeding and the genetics.

The book Thoroughbred Breeding: Pedigree Theories and the Science of Genetics shows the differences between selective breeding and the different theories in the equine breeding society. Dr Matthew Binns and Tony Morris, both extremely knowledgeable in the equine field, wrote the book in an article type format, as well as filling the book with detailed illustrations and sketches of the different breeding patterns. Concluding, the book states that breeding selections and different breeding theories have been in history for a long time and while only certain breeders follow the breeding selections, the history of the genetics will follow for years to come.

Individual Literature Review #7 (In-Person Fair)

Equine Tetanus: What You Need to Know

Addison W., D3 HM/D3 Eventing, Hinkson Valley PC (Midwest Region)

Tetanus is an important disease for horse owners to know. Tetanus is a result of infection by an anaerobic, spore forming bacterium called Clostridium tetani. It is caused by the production of a neurotoxin. The Clostridium tetani spores are commonly found in the soil. Because these spores are everywhere in the environment, horses are at risk of infection if they have open wounds, sores, or other conditions that make it easier for the spores to enter the body. Clostridium tetani can also be found in the intestinal tract and feces of animals. Some clinical signs of infection are, "Sawhorse Stance," raised tail, sweating, flared nostrils, prolapsing of the third eyelid, muscle spasms, and (the most common) is an inability to eat or drink known as "Lock Jaw." Some things in the "Supportive Care" area that will help with the clinical signs are reduced stimulation (somewhere dark, calm, and quiet), muscle relaxants, and fluid therapy. The use tetanus antitoxin to help bind together the neurotoxin is very important as well. This can be given to a sick horse by intravenous or subcutaneous injection. The best action against Clostridium tetani infection in horses is vaccination. A once yearly vaccine is very effective for preventing infection in most horses and ponies. Regular veterinary care and vaccination, careful wound management, and prompt recognition of clinical signs can help protect horses.

Individual Literature Review #8 (In-Person Fair)

Sergeant Reckless
Aubree Rose S., D3 Western/D3 Eventing, Run O' The Mill PC (Lakeshore Region)

Two of my favorite things are American History and of course, horses. My grumpa (grandpa) was a Marine, and he told me about Sergeant Reckless, the little horse who did big things in the Korean War. Ever since then, I've been interested in learning everything I can about her! My favorite book about her is called Sergeant Reckless by Patricia McCormick.

Sgt. Reckess was a thoroughbred and mongolian cross and the only animal to hold an official ranking in the United States Marines because of the work she did in the Korean War. She was an ammunition horse, which means she would carry ammunition up and down steep terrain. Sometimes she would even carry wounded Marines back to camp. When she was at camp, the Marines quickly learned that food was the way to train her. They used all sorts of different foods to teach her how to lie down to avoid bullets, how to walk her route on her own, and how to trot back to her personal bunker when they shouted "retreat!". Sergeant Reckless was seriously injured two times, one shot right above her eye and the other on her flank, and those both earned a Purple Heart when she retired.

The story of Sergeant Reckless taught me that horses are an important part of our country's history, and that having a horse nearby can boost the spirits even in the worst situations like she did for her fellow Marines.

Individual Literature Review #9 (In-Person Fair)

Equine Ringworm
Stormy B., D3, Hinkson Valley PC (Midwest Region)

In my literature review I explained equine ringworm. First topic I went over was what equine ringworm is. Then I went over is how equine ringworm is diagnosed. After that I went over was what causes ringworm. Lastly I went over treatment for ringworm.

Individual Literature Review #10 (In-Person Fair)

To Boot or Not to Boot?

Lily A., D2 HM/D1, Lead Hound PC (Northern Lakes Region)

My question is, "Do "working boots" help horses or harm them?" By “working boots,” I mean polo wraps, brushing boots, and any boot a horse wears over its legs (not bell boots) to work. I found that working boots can protect horses from external injuries (such as cuts or bumps). Still, the horse's tendons can overheat, creating a big problem. I concluded that working boots could be helpful as long as the owner knows the horse, the boots, and why they need them. I used the following sources:

https://thehorse.com/110289/the-science-behind-equine-boots-and-bandages/
https://cehhorsereport.vetmed.ucdavis.edu/news/10-things-you-might-not-know-about-sport-horse-medicine-and-rehabilitation
https://www.extension.iastate.edu/equine/superficial-digital-flexor-tendinitis
https://www.canr.msu.edu/news/how-to-protect-your-horses-legs
https://practicalhorsemanmag.com/health-archive/horse-boots-101-30069/

Individual Literature Review #11 (In-Person Fair)

Enteroliths
Cadence O., D3 HM/D2 Eventing/D2 Dressage, Dune Riders PC (Lakeshore Region)

Information on what enteroliths are, how to determine if your horse has them, and how to prevent them from forming.

Sources:
www.Ker.com
www.nebi.blm.nih.gov
www.cleh.vetmed.ucdavis.edu
www.Equusmagazine.com
https://pubmed.ncbi.nlm.nih.org

Individual Literature Review #12 (In-Person Fair)

Don’t Turn a Blind Eye to Blue Eyed Horses

Elaine F., D2 HM/D2 Eventing, Foxwood PC (Great Lakes Region)

About nine months ago my parents finally said I could have my own pony! My grandma, mom, and I were looking on the Internet when we came across a large pony named Ice Man being sold just 30 minutes from our house. It turned out he was a handsome, white, few-spotted Appaloosa POA with brilliant icy blue eyes. I've heard horses with blue eyes have a bad reputation for going blind. Is this a myth or is it true? When my grandma told me about this USPC Research Fair, I immediately knew that horses with one or more blue eyes would be the topic of interest for my project.

Many horse people have heard at least one person say you shouldn't buy that blue-eyed horse because they'll become blind from Moon Blindness (equine recurrent uveitis) in their later years as it is not curable. But the truth is that the blue color of the iris isn't the problem at all! Science has shown no correlation with blue eyes vs brown eyes in horses and uveitis. The real problem is horses with blue irises often have pink skin around some or all of their eyelids. This pink skin is more prone to developing skin cancer called squamous cell carcinoma from sun exposure.

I sent a Google survey of five questions to find out who in my Pony Club region either has a horse with blue eyes or knew of a horse in their barn. My plan is to follow up with education as to what can be done for prevention of skin cancer in horses having eyelids with pink skin. There are three main methods for protection from the sun: 1. face mask, 2. timing of daily turn out, and 3. tattooing the eyelids.

As a result of gathering information for this project, the truth became obvious that cancer of pink eyelids in blue-eyed horses is the problem and not Moon Blindness. Thus the question: "Do blue-eyed horses become blind more often than brown-eyed horses is a myth!"

Individual Literature Review #13 (In-Person Fair)

Understanding How to Help Your Pony Thrive After EPM

Ryleigh A., D3, Green Spring Hounds PC (Maryland Region)

The research focus is centered on E.P.M or also known as Equine protozoal myeloencephalitis. The presentation will detail how horses can still thrive after having EPM.

The research method used will include websites, articles, and personal experiences through interviews.

The results of the research will provide evidence of how EPM affects the horse after treatment.

The conclusion will support the findings of the study.

Individual Literature Review #14 (In-Person Fair)

Question of Quality

Michaela F., HB HM/C3 Eventing, Mill Creek PC (Midwest Region)

Horses are often viewed as more than livestock in the equestrian world. Often, they are seen as pets and members of the family. This makes it difficult when the time comes to say goodbye to these beloved animals. The idea that your horse will live a long life and, one day, will peacefully pass in their sleep while in a pasture, is a sweet thought, but it is hardly ever the case. For this reason, it is important to have a plan for when the time comes.

In making the difficult decision to euthanize an animal, a veterinarian and the owner of the horse should consider the prognosis and welfare or quality of life that lies ahead for the animal. Does the horse function well? Does the horse feel well? Does the horse have the capacity to perform behaviors that are innate? When a horse no longer has good welfare, meaning its life no longer has positive value to it, or the negatives will soon overcome the positives, a good death is the most humane thing to do. “Euthanasia will relieve the animal’s suffering, which is the desired outcome” (AVMA Guidelines).

For my literature review, I explored the three different approved methods of euthanasia, which are included in the American Veterinary Medical Association guidelines. I have focused primarily on the two methods that are used by veterinarians in regular practice: intrathecal and euthanasia solutions. The other method is physical and includes the use of either a gun or captive bolt. The use of pentobarbital solution is one of the most common methods of euthanasia. However, the use of intrathecal lidocaine hydrochloride has recently been added to the AAEP and the AVMA euthanasia guidelines. Why did they add another method of euthanasia? Was there a need for this addition? Which one should you choose? In my presentation, I will explain the long-term effects of these methods on the environment and other factors which may affect your decision for your horse.

Individual Literature Review #15 (In-Person Fair)

Equine Cancer

Alaina M., C+ (C2 HM/C3 Eventing), Hinkson Valley PC (Midwest Region)

This year I decided to do my research project on equine cancer in honor of my pony Justin who passed in 2022 due to his cancer. I went over the common types of cancer while focusing on squamous cell carcinoma. I used peer-review research papers as well as medical articles as my primary sources and supplemented with information from equine vets from the University of Missouri vet school. In my presentation I will go over types of cancer, causes, signs and symptoms, treatments, and more.

Individual Literature Review #16 (In-Person Fair)

Cross-Training with Both English and Western Riding is Beneficial to a Horse's Overall Performance

Lauren M., D2 HM/D2 Eventing, Shoal Creek PC (Midwest Region)

There has always been a line in the sand when it comes to English and Western Riding, and there are also many differences in each discipline, such as the position of a rider. In English the rider is more upright and uses more core. They also have more contact with the horse's mouth. In Western the rider slouches more and rides with their seat they also don't have as much contact with the horse's mouth. Another difference is the tack used, English saddles are designed to be close contact and allow the rider to give the horse clear cues such as with their seat and legs. The Western saddle was designed for comfort and a way to use it for more than just a saddle. Despite all the differences between the two disciplines, they can still benefit a horse's training. I can see this in my horse, English helps me teach him balance and timing, and Western helps him desensitize and supple.

Many articles in equine research facilities and magazine articles are used in this project. For this research I wanted to dig into both worlds of English and Western, not to set them apart but to bring them together. There are many people out there that have trained in both English and Western. A horse doesn't have to have just one job. My horse's diversity is also beneficial for his work ethic. When I notice that he is not interested in jumping as much I rope a little on him or we do a dressage pattern to change it up. Horses don't want to do mundane activities. They like a challenge and a test, I see expanding disciplines as a challenge for them. Not only is it good for a horse but also for a rider. I started out as a Western Rider and wanted to give English a try. English has grown my riding capability's in so many ways. I now recognize the importance of natural aids, my balance has improved, and it gives me a challenge and a new thing to try with my horse.

The findings of this research supported the statement that Cross training with both English and Western riding is beneficial to a horse's overall performance, from the mental, the physical, and being favorable to the rider. There are so many ways that Cross training in English and Western is helpful. I am so thankful I could try this theory with my horse, and see the improvements firsthand from him being comfortable in both leads, to improving his timing and becoming more supple. And I hope that I can encourage other riders who want to improve their riding and their horses to really consider Cross-training as a great option.

Individual Experimental Projects

Individual Experimental Project #1 (Virtual Fair)

Grooming to Cool Down

Ellanore W., D2 HM/D1 Eventing, River Hills PC (Southern California Region)

My hypothesis is that grooming will help to cool a horse down faster, than not grooming. My plan is to take my pony's heart rate using a stethoscope before work to get a baseline. I then plan to lunge him for 3 minutes: walk, trot, and canter. After the 3 minutes of lunging, I will take his heart rate immediately to see how high it went up. I will then wait for 3 minutes, doing nothing to him or with him, just standing. After the 3-minute wait, I will take his heart rate again to see how far it came down during the cool down time. That will be my control group. My experiment will be, after lunging, take his heart rate again immediately, then begin grooming for 3 continuous minutes. After the 3 minutes, I will take his heart rate again to see how far it came down. I will compare these heartrates to each other to determine if grooming helps to cool down a horse faster, than doing nothing. I plan to do 3 separate control samples, and 3 separate experiment samples, all on different days. My conclusion will tell me if grooming lowers a horse’s heart rate faster after work than simply standing. I think that grooming is relaxing for horses and will help to lower their heart rate faster than, not grooming. I plan to use the same horse, Little Dude, for all 6 of the samples. I plan to curry comb and brush him for the grooming portion.

Individual Experimental Project #2 (In-Person Fair)

To Drink or Not to Drink

Elle C., D3 HM/D2 Eventing, St. Augustine PC (Delmarva Region)

Cold weather affects the volume of water a horse will consume leading to health issues such as dehydration and colic. My research is on using an additive to water to see if it will encourage a horse to drink more in cold weather.

Individual Experimental Project #3 (In-Person Fair)

Worming for Success

Jenavieve F., C2 HM/C2 Eventing, St. Augustine PC (Delmarva Region)

Question:
How can we keep equine fecal counts low in the equine industry?

Hypothesis:
If fecal counts are tested in equines before deworming, then this will be more beneficial because a horse who constantly gets dewormer or continuously get dewormer daily, will have the parasite build a tolerance to dewormer, causing the equine to become a high shedder.

Procedure:

- Research deworming practices in the equine industry on the web and in books
- Interview our veterinarian
- Obtain a fecal sample from different equine breeds on different deworming practices
- Send the fecal egg counts to the testing lab
- Interview our veterinarian and take in data about the fecal egg counts
- Obtain the fecal egg counts data and decide whether they are a high shedder, low shedder, or medium shedder
- Chart and document which deworming practice is the most effective on keeping the equine breed as a low shedder

Application:
The experiment relates to the real world by allowing people who own horses to know which deworming practice should be done to keep the horse as a low shedder. Showing people which deworming practice is the most effective and the best option for their horse to stay heathy and fit.

Results:
As a total of eight different fecal egg tests were ran at the veterinarian's lab, of the different deworming practices such as daily dewormer, deworming four times a year, horses who have not dewormer for at least a couple of years (medical reasons) and, horses who get a fecal egg count and then dewormed (if necessary).

Conclusion:
The results and research done have shown that the hypothesis that I stated was correct scientifically. The horses that had daily wormer ended up being high shedders from the fecal egg tests being ran in the lab. The horses that had little to no dewormer ended up being a low shedder and the horses who had a lot of dewormer being used ended up

being in the high shedder category. Showing that the research done and the tests being ran shown that the more dewormer that the equine gets, the higher chances that they will become a high shedder.

Interviews:
With Dr. Smith on the date of November 3, 2022, on the phone
With Dr. Smith on the date of December 16, 2022, on the phone
With Dr. Smith on the date of January 14th, in the lab

Websites:
https://zeroeggcount.com
https://extension.psu.edu
https://proequinegrooms.com

Books:
Handbook of Equine Parasite Control
Horse Owner's Veterinary Handbook

Individual Experimental Project #4 (In-Person Fair)

Feed Bag Speed Analysis

Ella O., C1 HM/C1 Dressage/D2 Hunt Seat, Ad Astra PC (Midwest Region)

My hypothesis is that square nylon feed bags will lead to the slowest consumption of hay. In order to conduct my research I researched the consumptions speed while using 3 types of hay bags as well as feeding on the ground. My research was conducted on 5 different horses/ponies who are kept in stalls during the night. My results showed that using a nylon square “slow feeder” hay net leads to the slowest consumption of hay. This research is important for those wanting to slow hay consumption for medical purposes, reduce hay waste, and create a more natural rate of consumption.

Individual Experimental Project #5 (In-Person Fair)

A Heart for Music

Aubree Rose S., D3 Western/D3 Eventing, Run O’ The Mill PC (Lakeshore Region)

I use music to pump me up or calm me down, and I wanted to know if horses felt the same way. Since I cannot ask them, I decided to test three of my horses' heart rate at rest, and then with a few different types of music. My "lab ponies" were a 21-year old quarter horse gelding named Cowboy, a 5 year old thoroughbred named Amaris, and my 20-something welsh cross named Junie. I used rock, country, theatrical, and classical types of music on each horse. For each type of music, I used my Pony Club training and found the horses' heart rate and recorded it in my research journal. I discovered that each horse reacted differently to each song. This project helped me answer my question about how horses react to music and how each music genre made a difference.

Individual Experimental Project #6 (In-Person Fair)

Analysis of Hay to Meet the Nutritional Requirements of a Welsh Pony

Charlotte H., C2 HM/C2 Dressage, Hinkson Valley PC (Midwest Region)

Without knowing the nutritional composition of your hay, you can only estimate how much your horse needs. Being aware of what is actually in the hay can help avoid overfeeding and to not be overly restrictive. The problem is that most horse owners are unsure of how to test their hay's nutrients, so they guess. Effects of an inaccurate guess could be obesity or malnourishment. Luckily, a professional hay analysis can get accurate results of the nutrients in your hay. My hypothesis was that our home-grown fescue hay would provide my Welsh pony with all required nutrients (except water). I borrowed a hay probe and used it to sample twelve square bales produced on our farm during first cutting. I sent the sample to Equi-Analytical and received results within a week. I used the results to calculate how much hay my pony would need to get the appropriate amount of each nutrient. Ultimately, I was able to conclude that our hay provides my pony with all necessary nutrients, through a very simple process. If horse owners have a greater understanding of their hay, they can know how much they need to feed to maintain a healthy horse.

Individual Experimental Project #7 (In-Person Fair)

The True Value of Senior Horse Complete Feeds

Juliana D., C1 HM/D3 Dressage/D2 Eventing, Liberty Oaks PC (Sierra Pacific Region)

Have you ever wondered what is actually in your feed bag? You can look at the information they provide but what about the information they don't provide? My experiment is designed to find the true value of three different brands of senior horse complete pelleted feeds and compare them to each other based on their Total Digestible Nutrients (TDN) and amino-acid profiles. Some other interesting comparisons are the Protein, Fat and Fiber content (which are listed on the guaranteed analysis of the feed) and the Ash and Moisture (which are not listed on the guaranteed analysis of the feed). The data was collected by conducting an Equine TDN Test and an Amino-acid profile at Cumberland Valley Analytical Services in Waynesboro, Pennsylvania. I concluded that the true value of a pelleted senior feed cannot be found by just reading the label and that other elements may need to be taken into account.

Group Experimental Projects

Group Experimental Project #1 (In-Person Fair)

Stretches to Success

The Barn Rats
Aubrey M., D1, Brier Bank Farm PC Riding Center (North Central Prairie Region)
Audrey B., D2, Brier Bank Farm PC Riding Center (North Central Prairie Region)
Molly S., D3, Brier Bank Farm PC Riding Center (North Central Prairie Region)

Our project takes into account whether biweekly stretching helps to increase the horses' flexibility. Our group took data of a variety of horses and used treats to encourage stretching. We documented using photography.

Group Experimental Project #2 (In-Person Fair)

Jamming Out: Does BPM Affect Horses?

Tracking Up
Hunter M., D3 Eventing, Casanova-Warrenton PC (Virginia Region)
Lillian W., HB HM/C2 Eventing, Casanova-Warrenton PC (Virginia Region)

It's fairly common to encounter music in the equestrian world. Whether it's playing over the barn speakers, in a show arena, or a fun addition to a schooling session. In a study by Janet Marlow, she states that horses enjoy strong melodies, rhythmic patterns, and are most relaxed when exposed to country and classical music. Susan McBane found that horses are only relaxed by music for up to thirty minutes and prefer music without human voices. However, little research has been done on how horses respond to the beat per minute (BPM) count of a song. Do horses exhibit a behavior change when exposed to certain BPMs? Could the BPM of music reduce pulse and respiration by a significant amount regardless of the genre of music?

We tested twenty-one instrumental songs across five genres and five BPM counts, in addition to a control minute of silence, to see how horses would react. The horses were put in cross ties and each song was played for one minute as we measured pulse, respiration, and watched for certain behaviors.

Using a Pearson Correlation analysis, across all twenty-three horses, the fluctuation in pulse/respiration did not correlate to the changes in the BPM of the song (0.046 and 0.025, respectively). Using a linear regression analysis to generate a predictive model, the best fit predicts that an increase of one BPM corresponds to an increase of 0.007 in pulse, or an increase in heart rate only 1.05 between the silence control and 150 BPM music. In contrast, certain behaviors such as tail swishing were far more predictive of an increase in heart rate (6.918 independent of BPM). We conclude that the BPM of a song does not significantly affect the behavior, pulse, or respiration of a horse.

Group Experimental Project #3 (In-Person Fair)

Does My Horse Have a Favorite Color?

Pony Tails
Allison M., D1, Brier Bank Farm PC Riding Center (North Central Prairie Region)
Kora G., D1, Brier Bank Farm PC Riding Center (North Central Prairie Region)
Reese E., D2, Brier Bank Farm PC Riding Center (North Central Prairie Region)
Nora E., D2, Brier Bank Farm PC Riding Center (North Central Prairie Region)

Research shows that horses can see a limited range of color. Other studies have shown that horses have the ability to tell the difference in colors and even have a preference. Humans have what is called trichromatic color vision where horses have dichromatic color vision. Blue and Yellow are the main hues that horses are believed to see.

So does my horse have a color preference?

My group members used two food bowls, similar to a dog bowl. One white and one blue. We then took our three favorite horses, Quaffer, Pache and Presto. The horses were placed them in an empty stall with the two buckets. Each bucket contained a treat, a German muffin. One bucket or crock, was white and the other blue. We tracked which bowl the horse went to first to get his treat. While the bowls were always placed in the same area of the stall, the white and blue bowls were set to the left and right arbitrarily. While it wasn't part of this experiment, we noticed that when we took the horses to that stall to perform the test after the initial test, they went straight to a bowl to get a treat. It didn't take long for them to know what was waiting for them.

The data which will be reflected in a graph show that there was no real preference in color. While our research has shown that the blue hue can be detected by horses, it doesn’t seem to have made an impact as to the choice of the horses.

Group Experimental Project #4 (In-Person Fair)

Analysis of an Equine Retirement Farm

Out to Pasture
Mae L., C1 HM/D3 Hunt Seat Equitation, Hinkson Valley PC (Midwest Region)
Sophia L., C1 HM/D3 Hunt Seat Equitation, Hinkson Valley PC (Midwest Region)
Keira S., C1 HM/D3 Hunt Seat Equitation, Hinkson Valley PC (Midwest Region)

Equine retirement farms provide an important service for the horse community. There are a variety of equine retirement farms throughout the country, which range in size from just a few horses to farms with over 100 horses. Some farms provide grooming and stalls and other farms are pasture turnout in a herd with daily feeding and health checks. Most retirement farms contacted had approximately 30-50 horses. This project specifically analyzes one of the largest equine retirement farms in the country. Little Tree Farms, originated in 1997, currently houses 163 horses in a pasture setting with access to shelter and fed daily concentrate rations along with free choice hay or grass pasture access depending on the time of year. The farm is approximately 1500 acres located in central Missouri.

Methods: Data was collected on current live retirees (163) and previously retired now dead horses (33). One hundred ninety-six horses were included. A spreadsheet was constructed listing name, breed, sex, age at retirement, reason for retirement, previous job, current age, dead/alive, cause of death, known health problems, and state of origin. From this spreadsheet the following were determined: average age at time of retirement, average age of current retirees, most common breeds, most common sex, most common reason for retirement, most common disciplines represented on the farm. Numerous owners were interviewed to gain information along with the farm owner.

Results: The average age of horses at retirement is 17 years and the average age of currently retired horses is 21 years. The oldest horse is an American Miniature stallion, currently 35 years of age. The youngest horse is a 9-year old gelding. The horse retired the longest is 30 years old, retired in 2005 and is a pony. Common reasons for retirement include lameness from a variety of reasons, but also behavioral issues as well as old age or changes in the owners' lives. The most common breed is warmblood and the most common discipline is hunter/jumpers. There were no known retired eventing horses on the farm. There were many lesson horses, dressage horses, and trail horses. Most horses came from New York and Florida.

Conclusions: Most horses are retired in their teens, mostly due to lameness issues but also including a variety of reasons for retirement such as behavioral issues, neurological problems, or changes in the owners' circumstances. The majority of the retired horses were performance horses, mostly hunter/jumpers. A variety of breeds are represented, but warmbloods are most common and geldings are retired in greater numbers than mares. It will be interesting to continue collecting data on why people retire horses, what the specific causes of lameness are, how long horses live in retirement as well as what

sort of medical problems they face while retired, and the most common cause of death of retired horses.

Group Experimental Project #5 (In-Person Fair)

To Oil or Not to Oil?

Hoof Helpers
Sydney B., D3, Brier Bank Farm PC Riding Center (North Central Prairie Region)
Madeline Mae O., D2, Brier Bank Farm PC Riding Center (North Central Prairie Region)

We got two Horses and put oil on the front left hoof every day and just picked out the right hoof. We recorded our data each day for a week. We took a picture of both front hooves every day. We Waited 10 minutes after applying oil to let it dry and soak in before we took our picture. We looked at the differences between the front hooves and noticed some differences between the hooves such as strength and the way the hoof looked.

Group Literature Review

Group Literature Review #1 (In-Person Fair)

Equine Cloning

OTTB Twins
Lillian K., C2 HM/C1 Eventing, Mill Creek PC (Midwest Region)
Rayna W., C2 Eventing, Mill Creek PC (Midwest Region)

How does the growing popularity of equine cloning affect different areas of the equine industry? Through the use of veterinarian research, along with the real accounts of people who have interacted with cloned horses, we were able to uncover many different aspects of equine cloning. We discovered the reasons for cloning, as well as the similarities and differences that can be expected from the clone and donor. All of the information we found helped us to conclude that cloning in the equine industry could affect the breeding, competing, and riding aspects of our sport.