2022 USPC Convention

2022 USPC Research Project Fair

Presented by the Grayson-Jockey Club Research Foundation

Grayson-Jockey Club Research Foundation

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Abstract Book

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Judges

Adrienne Bushau-Sprinkle, PhD (virtual)

Bo Varnado (virtual)

Kelly Tighe (in-person)

Kelly Vaughan, PhD (in-person)

Shawna White (in-person)

Organizer

Yvette Seger, PhD

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Individual Experimental Projects

Individual Experimental Project #1 (Virtual Fair)

Does Compost Really Work?

Charlotte H., D-2 Riding/C-1 HM, Hinkson Valley Pony Club (Midwest Region)

My project's purpose is to educate on composting and to test if plants grow better in soil that is mixed with compost. First, I'll present details about the process of composting. For the experiment part of my project, I have a compost pile that I managed and recorded over time. Every Sunday, I took its temperature, took a progress picture, tested moisture, and flipped it. In an egg carton, I am growing various seeds in 50% soil and 50% un composted manure, 50% soil and 50% partially composted manure, and 50% soil with 50% fully composted manure. My hypothesis is that plants that grow in more fully composted manure will grow healthier and faster than plants in un-composted manure. I'll be using my two horses as helpers in making the compost. Their soiled bedding and manure will be the base material of my compost. The outcome of my experiment will be shown in my virtual presentation on the 15th.

Individual Experimental Project #2 (Virtual Fair)

Straight From the Horse’s Mouth (and Other Body Parts)

Aubree Rose Soleska, D-3, Run O’ The Mill Pony Club (Lakeshore Region)

This project is straight from the horse's mouth (and a few other places!). I knew horses carried bacteria, but I wanted to know if it was the same all over their body or different kinds. To find my answer I used a sterile cotton swab to collect bacteria from two of my horses, Snaggletooth and Cowboy. I swabbed their mouth, their hoof, and their skin. I put each swab onto a petri dish to grow the bacteria. After a few days, I went with my Aunt Abbie to the biology lab at UW-Whitewater to check on the bacteria. We found many different types of bacteria that grew! Each sample was very different from the others. This means that they do not have the same bacteria around their body and each horse has different bacteria, too. After I looked at the bacteria growth, I picked Snaggletooth's skin sample to look at under the microscope. I learned how to do a gram stain to get the sample ready to be looked at under the microscope. It looked like pink and purple confetti! This research project taught me that each horse has different bacteria all around their body.

Individual Experimental Project #3 (Virtual Fair)

Saddle and Tack Care
Riley Y., UR/D-1, Whitebrook Farm Pony Club (Southern California Region)

This project is an experiment in saddle and tack care. Riley asked "why do we need to clean our tack." In her experiment a bridle was left outside and uncared for. It became dry and cracked, making it weak and unsafe to use. Riley learned that proper tack care is important for both horse and rider.

Individual Experimental Project #4 (In-Person Fair)

Can Horses Talk?

Annabelle M., D-1 HM, Park City Pony Club (Intermountain Region)

Have you ever wondered if horses can talk? If they can, they can tell you what kinds of treats they like and other information that helps you take care of them. If horses can use buttons to choose certain treats, their owners will know more about them because horses can tell them what they like. I conducted this experiment using recordable speaker buttons for the words "carrot," "treat," "apple" and "hay." I first taught three horses to use the buttons individually, then I put all four buttons together to see if they could name what item I was holding in front of them before they got to eat it.

Individual Experimental Project #5 (In-Person Fair)

ASIP and MC1R Research Project
Abigail G., HB/C-2 FL/C-1 EV, Epona Pony Club (Northeast Region)

Equine coat color genetics, specifically ASIP, the agouti signaling protein, and MC1R, melanocortin-1-receptor, genes regulate the melanin pigmentation produced in a horse's phenotype. When the ASIP gene is dominant (A/A or A/a), the black points will be restricted to the horse's (mane, tail, and eartips) and the horse will be a various shade of bay. If the ASIP gene is recessive (a/a), the horse is going to be totally black. In order for a chestnut phenotype to be expressed and pheomelanin to be produced, the ASIP gene will provoke the MC1R gene in order to restrict the amount of a-melanocyte-stimulating hormone that is being produced; however, if the MC1R gene does not become restricted or if the ASIP gene does, then an excess production of eumelanin will result in black pigmentation being produced.

The question this project will answer is how will ASIP and MC1R genotypes of dun horses compare with well characterized bay, dark bay, chestnut, and black phenotypes. Research has shown the genotypes expected of the ASIP and MC1R genes would be: black $E^{E}E^{E}$-$A^{a}A^{a}$, brown $E^{E}E^{E}$-$A^{A}A^{a}$, dark bay $E^{E}E^{E}$-$A^{A}A^{A}$, and $E^{E}E^{e}$-$A^{A}A^{A}$, bay $E^{E}E^{e}$-$A^{A}A^{A}$, and chestnut $E^{e}E^{e}$-$A^{A}A^{A}$ (Shang et al, 2019). How ASIP and MC1R affect a dun is uncertain. In order to answer the question, saliva samples were collected from five different horses: one black Morgan stallion, one dark bay Quarter Horse mare, one bay Thoroughbred mare, one chestnut Trakehner stallion, and one dun Hanovarian/Thoroughbred mare with a visible dorsal stripe. The hypothesis is: If the dun phenotype is similar to a bay, then the bay genotype will be characterized. DNA has been extracted from all the samples. The genes will be amplified using PCR (polymerase chain reaction) and gel electrophoresis will be conducted. The genotypes of bay, dark bay, black, and chestnut have been characterized and the dun genotype will be compared.

Individual Experimental Project #6 (In-Person Fair)

Effectiveness of Wound Care Options
Bella E., D-3, Crescent Bay Pony Club (North Region)

One day I observed an infected fly bite on my horse. Immediately, I went to my first aid kit for a topical remedy. I found tea tree oil and antibiotic ointment. Remembering an online article claiming the effectiveness of honey used to heal wounds, I wondered if this was also a viable option. Then I started to wonder, "does antibiotic ointment work as effectively as tea tree or honey to heal superficial wounds?" What would happen when a cut is treated with honey, tea tree oil, or antibiotic ointment? Which one of these remedies works more effectively?

Individual Literature Reviews

Individual Literature Review #1 (Virtual Fair)

Heat Conditions and Related Illnesses and Mitigation

Kathleen C., B, Diamondback Pony Club (Southwest Region)

This is a continuance from my last year's Research Project to better understand climate and related impact on horses since moving from cool and wet western Washington to generally hot and dry Arizona. In my 2021 Research Project I explored topics such as devices to measure weather and the use of heat index charts along with physical measures to mitigate heat impact. I mentioned but did not extensively explore the use of electrolytes and heat related illnesses in horses feeling that they could be so encompassing as to be their own research project. Thus, the basis for this research project. I found it odd that many of our typical days here in Arizona combining the temperature and the relative humidity didn't even register on the many heat indexes I found. I have since found a heat index for low humidity areas such as Arizona frequently is. Now this makes much more sense as I suspected that some of the year, we would be in a danger zone or above when it didn't appear as such on the commonly found charts.

Both electrolytes and anhidrosis are much more complicated topics than measuring devices and charts. Anhidrosis is still not fully understood. There is still some controversy on electrolyte use, as well as doses and recipes. Couldn't always find details specifically to horses so sometimes used fellow mammal research figuring it was close enough to for general ideas and theories by using respected sources for both humans and animals. Here I share what I have learned on these interesting topics.

Purpose: Continue education from last year's research on hot weather impact on horses in southern Arizona. Delving into mitigation such as electrolyte usage and recognizing heat illnesses.

Research: Literary research on hot weather and related illnesses along with mitigation such as electrolyte usage.

Hypothesis: Awareness and recognition of hot weather implications, illnesses and mitigation in USPC SW Region where I currently live. Relocated from cold wet climate (western Washington) where electrolytes were seldom called for or used. Also, barley aware of heat related illnesses in horses.

Procedure: Used Pony Club Manuals as starting point branching out to USPC website and beyond for research.

Analysis: The most frequently located heat index charts for both equines and humans do not always account for the low humidity levels found in Arizona.

Conclusion: If going by the wrong heat index chart could be in caution or dangerous zones and not fully realize it. Expanded my knowledge on electrolyte usage pre, during and post events such as trailering and competitions. Would now recognize severe anhidrosis and signs of heat stroke in a horse.

Individual Literature Review #2 (Virtual Fair)

Scraping the Surface of Horse Genetics

Melody D., D2, Diamondback Pony Club (Southwest Region)

This is a literature piece I wrote based on my research about how horse genetics work, with the focus on genes related to color determination. I separated my project into six different sections, Base coat genes, Dilution genes, White spot genes, How any Punnett square works, Different gene combinations and their results, and my conclusion. My research paper describes the basic formula on how genetics help pre-determine the color a horse will be. I also explore a little deeper into horse genetics in some of the sections. In my first section I discuss the three base coats of a horse and discuss a little about pigmentation and how it is determined. In the second section my discussion goes a little more in depth into pigmentation as well as discussing dilution, what it is and it's effects on color. In the third part I discuss the basics of white markings and explain/describe some of the different white patterns. In the fourth section I explain the basics of what a Punnett square is and how to use it. In the fifth section I provide some examples of genetic combinations as well as some genetic issues that are sometimes present as a result of the color of the horse's coat. My conclusion is an extremely brief summary of my research. Please keep in mind this research project just gives the basic foundation of horse genetics and their effects on the determining the color of a horse.

Individual Literature Review #3 (In-Person Fair)

Body Condition Score

Juliana D., D-3 HM/D-2 DR/D-1 EV, Liberty Oaks Pony Club (Sierra Pacific Region)

The focus of this research is to learn more about Body Condition Scoring using a literature review.

Resources:

Harris, Susan E. and Pony Club. *The United States Pony Club Manual of Horsemanship Intermediate Horsemanship C1 - C2 Level*. John Wiley and Sons, Inc., 2013.

University of Kentucky College of Agriculture Food and Environment. "Body Condition Scoring Horses: Step-by-Step". *The Horse*, 15 Jan 2019, https://thehorse.com/164978/body-condition-scoring-horses-step-by-step/ 4 Jan 2022.

Iowa State University Extension and Outreach. "The Body Condition Score". Iowa State University Extension and Outreach, 1995-2022, https://www.extension.iastate.edu/equine/body-condition-score4 Jan 2022

Body Condition Scoring (BCS) is a scale used to measure the current level of fat on the horse's body and is a good general indicator of the horse's health. Horses are scored on a scale of 1-9. 1 being extremely emaciated, 9 being outrageously fat and 5 being a good healthy weight. You would use Body Condition Scoring to evaluate your horse to see if they are thin, fit or obese. Body Condition Scoring plays into your conditioning program. Before you start conditioning you need to assess your horses BCS. If your horse is too thin they need special feeding, care and exercise, the same goes for a fat horse. You would not condition a horse with a BCS of 4 as you would a horse with a BCS of 7. In conclusion, Body Condition Scoring is a useful tool to evaluate your horse's level of fitness, weight, and health.

Individual Literature Review #4 (In-Person Fair)

Mystical Muzzle: What Does That Wiggle Mean?

Mae B., D-1 HM, Mill Creek Pony Club (Midwest Region)

I'm pretty sure we all ask ourselves the same question: why does a horse wrinkle up their muzzle and show their teeth? It can be caused by many different things and often makes us laugh. It even has its own funny name: flehming!

Horses have a vomeronasal organ inside their noses that is extremely sensitive. It is shaped like a tube beneath their nasal cavity. Scientists believe the flehming movement can help horses concentrate the smell better so they can figure out more about it.
It is most commonly caused by new or strange smells or tastes. For example, if they are playing outside and smell something interesting like smoke. It can also happen when they are trying new foods. If you are starting your horse on a new feed they will probably show their teeth since they are tasting and smelling something new.

Pheromones are the scent of hormones and they can cause stallions and mares to flehmen. A mare who has just had a foal will also show flehmening when she sniffs her new baby. Young colts and young fillies flehmen a lot more than adult horses. It’s like practicing for being a grown-up horse.

Horses also use their mouth as a way to show body language to other horses or humans. In the herd, horses often bite and nibble each other to show who the strongest horse is. Sometimes when you're at shows your horse will get anxious and start doing unusual behavior like biting or being aggressive.

Sometimes a horse may flehmen when they are distressed. For example, if a horse begins to feel anxious or uncomfortable, they may start to flehmen more often. It can sometimes happen when a horse is starting to colic.

We know that watching a horse do this funny face is always humorous, but it can also be the key to understanding what they are thinking and feeling.

Individual Literature Review #5 (In-Person Fair)

Lub-Dup

Michaela F., HB/C-3 EV, Mill Creek Pony Club (Midwest Region)

While standing in the freezing weather with my horse's vet, we conversed about possible research project ideas that I could do this year. As she scrubbed my thoroughbred's back to prepare him for injections, we went over subjects such as Kissing Spine, Cushing's Disease, EPM, among other topics. Then, the light bulb went off in my vet's head, about a new and interesting topic. Recently, her grandfather had passed away and had left his pacemaker in his will to her. The pacemaker was to be specifically used by vets in an animal. I had never heard of this procedure and did not even know it was a possibility to put a pacemaker in a horse. That is why I chose this as my subject.

For my resources, I have used a number of books, clinical studies, and research articles about the cardiovascular system and pacemakers. I have also interviewed a couple of veterinarians to further my knowledge on the subject.

Pacemakers are used to help horses with certain arrhythmias. A couple types of arrhythmias include: tachycardia, bradycardia, and atrial fibrillation. The horse's heart has a natural pacemaker, also known as the SA node, which helps regulate the horse's heart rhythm. When an arrhythmia occurs, there has been a change in the rate, rhythm, or conduction within the heart. A pacemaker is placed in the horse's circulatory system in surgery to act as the horse's SA node.

In my research, I have tried to show how we have entered a new era in veterinary medicine. Nowadays, horses are living longer, happier, healthier lives because we have incorporated approaches and devices that were once only used in humans into veterinary medicine. In my project, we are going to be exploring the technique of putting pacemakers in horses. Some of the questions I will explore include: What is a pacemaker? Why would you use it on a horse? What are the benefits and negative outcomes of using a pacemaker? And how do you put a pacemaker in a horse? In conclusion, I hope that my idea captures your attention to the full and same extent that it did me.

Individual Literature Review #6 (In-Person Fair)

Equine Narcolepsy

Alaina M., C-2 EV/HSE, Hinkson Valley Pony Club (Midwest Region)

This year I decided to do a deeper dive into equine narcolepsy, a condition which my own mare, Salute The Truce, has. In order to research this topic, I am using scholarly articles and informational websites I find on the internet, books on equine health, and information directly from my veterinarian who has helped us with Truce and her narcolepsy. The goal of this project is to educate on signs and symptoms of equine narcolepsy, how to manage a horse with this condition, and how it affects a working horse. Ultimately narcolepsy can be scary but with proper management it will not have much of an effect on a working horse because narcoleptic episodes usually occur at times of low activity and rest such as standing in a stall or relaxing in the pasture.

Group Experimental Project

Which Bedding Will Keep Your Pony Dry? (Virtual Fair)

"14 Hands and Under"
Mae L., D-3 Eventing/D-3 HM, Hinkson Valley Pony Club (Midwest Region)
Sophia L., D-3 Eventing/D-3 HM, Hinkson Valley Pony Club (Midwest Region)

Introduction:
A clean, dry stall is important to pony health. A stall that is continuously wet can predispose a pony to different health problems, such as thrush and dermatitis and even respiratory issues if the stall smells of urine with no good ventilation. Also, if bedding is dusty it can cause or exacerbate respiratory problems, such as equine asthma. Dusty bedding can also be health issue for humans with sensitivity to dust. We would like to determine the most absorbent bedding.

Hypothesis: If different types of bedding are used then each type will have differing levels of absorbency.

Method and Materials:
Different types of bedding -
paper, pine wood chips, sawdust, straw, pellets (wet/dry), cedar

2 cups of water and 2 measuring cups

Control - pour 2 cups of water from one measuring cup to the other

Experiment - Place 2 cups of each type of bedding in a measuring cup. Add 2 cups of water to each type of bedding. Wait one minute then drain the water from the bedding sample into a measuring cup. Measure the amount of water that was drained from the sample after one minute. We will test each type of bedding five times measuring the drained water each time.

Results:

Trial	Paper	Pine Shavings	Pellets Dry	Pellets Wet	Cedar Shavings	Saw Dust	Straw
1	1 cup	.87cup	1 cup	.67 cup	1.33 cup	.67 cuo	2 cup
2	1 cup	.87 cup	.67 cup	.67cup	1.33 cup	.67 cup	2 cup
3	.67 cup	.87 cup	1 cup	1 cup	1.33 cup	.75 cup	2 cup
4	.67 cup	.87 cup	1 cup	.67 cup	1.33 cup	.75 cup	2 cup
5	.67 cup	.87 cup	1 cup	1.33 cup	1.33 cup	.67 cup	2 cup
Average	.80 cup	.87 cup	0.99 cup	.868 cup	1.33 cup	.70 cup	2 cup

Analysis
The average amount of water that was retrieved after soaking for one minute in the bedding was 1.327 cups. The maximum amount of water that was retrieved from the bedding after one minute was the full 2 cups and the minimum amount of water that was retrieved from the bedding after one minute was .67 (⅔) cups.

Conclusions:
Different types of bedding have different abilities to absorb water or urine. The data that we collected from pouring the water in the bedding does support the hypothesis that different types of bedding hold varying amounts of water. The amount of water held varied from as high as the full 2 cups to as low as .67 (⅔) cups.

We predicted that the paper bedding (.80 cups) would be most absorbent but the sawdust (.67) was actually most absorbent. This is because the sawdust has the greatest surface area and is very porous.

The factors that determine how much water any particular type of bedding can hold include, the surface area of the bedding type, how porous it is, the temperature of the water and inherent moisture content of the material used.