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Youth Science Canada
Sciences jeunesse Canada

Lauren Bunt



Junior / Discovery

Feed Bucket Preference and its Impact on Equine Medication Rejection

Twelve horses including a pregnant mare, several gelding's of varying ages, several mares of varying ages and a stallion were used to investigate the preference of various sizes of feed buckets to amount of food eaten. Oats were chosen as the preferred grain as it is present in all of the horses current diet and I wanted to reduce the possibility of feed rejection.

Project Forms

4.1C Animals (Lauren_Bunt_ethics ruling.pdf)

Background: Several hundred chronic diseases and conditions exist in horses which can cause weight loss and poor appetite. In some cases, horses feel sick because of their condition and subsequently do not feel at all like eating, even when there is plenty of food available. Like, humans, horses have different behavioral traits that may be genetic or may evolve as they mature. These can include preferences related to type of food and consumption habits. On average, close to 24 horses per week in the United States die from food and medication rejection. Statistics like these encouraged me to find out if there is a way in which we can help horses to consistently want to eat the food or medication that is put out for them. This type of research can continue to save the lives of horses if we can determine a preference for feeding. Would they prefer a certain colour of bucket? Or a certain size? How willing would they be to eat oats out of a particular size or colour of bucket?

According to a Master's thesis study completed in 2012 in New Zealand, by a Waikato graduate student Tania Blackmore, horses do in fact see colour. They can distinguish the difference between blue and grey, between yellow and grey, and between green and grey. But they have more difficulty with red. It also appears that yellow and green look similar to the study horses. However, more research is needed in this area.

It is currently believed through scientific study, that horses have dichromatic colour vision, meaning they can perceive green and blue spectrum. It is thought that their colour vision is somewhat like what is known commonly in people as red-green colour blindness (or more correctly called colour deficiency). This means that certain colours, especially red and related colours, appear greener.

Purpose: Better understanding of feeding preferences, specifically in relation to bucket size and colour, would be beneficial on a day to day basis in the horse industry. Current research seems lacking on this question. Results could help to avoid health risks and therefore significantly impact the lives of many horses and horse owners by reducing the problem of feed and medication rejection with an efficient, cheap, accessible solution.

Hypothesis: If I feed a horse oats from a certain size and/or colour of bucket then they will eat more readily and have a reduced chance for malnutrition and medication rejection.

Procedure: Nineteen horses, including a pregnant mare, brood mares, several geldings of varying ages, several mares of varying ages and a stallion were used to investigate their preferences for various sizes and colours of feed buckets as determined by the length of time required to eat a set volume of oats. Oats are generally considered to be well liked by horses, and were already established as a regular part of the diet for all horses in my sample group. By limiting the type of feed to only this grain, the possibility of feed rejection was minimized. All horses were fed at their usual time of day but were individually removed from the herd to reduce distraction. They were brought to the barn on a lead rope and guided to where the testing bowls had been placed in the aisle away from any other horses. Depending on the testing day, buckets of various sizes or colours had been placed side by side in an open area of the barn. Each of the buckets had a 240 mL measured amount of oats. All horses received the

same amount of oats. The horses were allowed to choose which bucket they had preference for, and once they decided, the non-preferred bucket(s) was removed. Each horse was observed and timed for the exact amount of time, in minutes, they took to consume all of the food in the chosen bucket. Start time was defined as the mouth opening to initiate the first mouthful. Stop time was defined as the completion of the last visible swallow before the horse lost interest (rejected) or finished the grain. The horse was then brought back to their paddock to graze. The experiment was repeated for each individual horse every day during the testing period.

During Day 1 and 2, all the horses were offered a large and small blue bucket. On Day 3 and 4, the horses were given the choice to feed out of the large red bucket or the small red bucket. On Day 5 and 6, the big yellow bucket was compared to the small yellow bucket. On Day 7, the horses had a choice between all small buckets: red, blue and yellow. On Day 8, I compared all three colours of large buckets.

Results: I choose to study preference of feed bucket colour, size and rate of feeding.

Blue Buckets: On Day 1, 5 of the 19 horses ate from the small blue bucket and 14 horses ate out of the big blue bucket with an average feeding time of 2.66 minutes. On Day 2, of comparing the big and small blue buckets, 3 horses ate from the small bucket and 16 ate from the large blue bucket with an average feeding time of 2.13 minutes.

Red Buckets: On Day 3 only one horse choose the small red bucket, Winnie, the pregnant mare and the other 18 horses ate out of the large red bucket. The average feeding time was 2:14 minutes. On Day 4, three horses ate out of the small red bucket and 16 ate out of the large red bucket with an average feeding time of 1:45 minutes.

Yellow buckets: On Day 5, all nineteen of the horses ate out of the big yellow bucket and ignored the small bucket. Average feeding time was 2:34 minutes. On Day 6, two of the geldings and one mare ate out of the small yellow bucket and 16 horses ate from the large yellow bucket. Average feeding time was 2:38 minutes. On Day 7, three large buckets were presented to each horse. Seven horses chose the large yellow bucket, six horses chose the large blue bucket and six horses chose the large red bucket. The average feeding time was 2:04 minutes. On Day 8, three small buckets were presented to each horse. Nine horses chose the small yellow bucket, three horses chose the small blue bucket and seven horses chose the small red bucket. The average feeding time was 1:33 minutes.

I did not feel that the horses had a preference for placement of the bucket on the right or left hand side. It did appear that the horses all saw the large blue bucket first but then made their decision as to which bucket they would prefer to eat out of. The large bucket was deep and the horses ate a few bites, pushed the oats around with their noses and routinely lifted their head quickly like they were checking surroundings. I also did observe that the majority of the horses played around with the food in the large buckets which slowed down the feeding time. My small buckets were a little too small as a lot of the horses spilled a little of the food on the ground and then licked it up. They did tend to eat faster and continuously out of the small buckets as there was less space to move the oats around.

Conclusion: The horses tested had a higher preference for the large feeding bucket when compared to the small. They had a higher preference of selecting the yellow

bucket in both the large and small comparison testing. I think they were slower eating out of a large bucket because the food spread out more and the horses had to take several smaller bites and lick or tip the bucket on its edge to access the oats. My small feeding bucket was a limitation of my study as some of the horses did spill some oats on the ground while eating and also tipped the bowl over. In my future experimentation, I would increase the size of the small bowl. The horses were also lead by halter and lead rope to the area where the bowls had been placed but I would also like to study how they would respond if they were allowed to roam freely and then make a bucket preference. Originally when deciding on this particular study, I thought it would be beneficial to record the differences between geldings, mares and stallion to determine if there were any behavioral differences in feeding, but throughout this study I now realize there is not.

It is currently believed through scientific study, that horses have dichromatic colour vision, meaning they are able to perceive mostly green and blue shades out of the full colour spectrum. It is thought that their colour vision is somewhat similar to what is known commonly in people as red-green colour blindness (or more correctly called colour deficiency). This means that certain colours, especially red and related colours, appear greener. Therefore, the next time I am treating a horse and there is hesitation or rejection I will try a large bright yellow bucket for feeding.

In the future, I would like to investigate how much communication between horses plays a role, or if distraction affects their feeding preferences, like adding music or gentle speaking. I could also test if exercise or increase in heart rate could affect

their eating habits. Further studies would allow us to gain an even better understanding of optimal feeding strategies in equine veterinary medicine.

Acknowledgements:

Scott Berry – Quinte Regional Science Fair Committee: for being there every step of the way. The guidance, encouragement, coaching and prep made the CWSF possible. I would have been lost without you!

Mrs. Moodey – Science Teacher, Albert College ~for her continued support and guidance in reviewing my project.

Laurel Harrison- Thistle Creek Farm ~ for allowing me to conduct the experiment and encouraging me throughout my testing and helping me dig deeper into my observations.

I am very grateful for the help of all the horses for being my test subjects. I would also like to thank my Mom for helping me record and driving me to the barn every evening. Without anyone I have stated above this project wouldn't have been possible.

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Request for Advice or Ruling Ethics Committee



Region:	Quinte			Date	March 2017
Title:	Medication Rejection				
	First Name	Last Name	Email	Phone	
Student 1	Lauren	Bunt	noelle.bunt@gmail.com	613-919-3243	
Student 2					
Chair, RSF¹	Scott	Berry	grstf@live.com	613-962-4189	
Chief Judge, RSF	Pat	Finlay	pfindlay@avaya.com		

Scott Berry wrote:

We have gone over this project and have interviewed the participant and have interviewed the supervisors and the parents. We feel it is of very low risk to the animals and that it is within the guidelines for using vertebrates.

Thank-you for your time

Scott Berry

Chair - QRSTF

Description of your Project

¹ Or Designate

Close to twenty-four horses on average a week in the United States die from food and medication rejection or owners pay around one-five thousand dollars for a NE-tube or an E-tube. For my Science fair experiment I am investigating how to avoid those losses or costs. I chose to do my experiment on how I can convince horses to willingly eat their medication or in my experiment oats, by changing the bucket color, size and feeding time.

a. Describe your proposed project in a paragraph or two.

Close to twenty-four horses on average a week in the United States die from food and medication rejection or owners use techniques for giving medication such as injections with needles or the use of a Ne-tube or E-feeding tube, which are both very invasive and expensive and there is high risk of negative side effects when these techniques are used. For my Science fair experiment I am investigating how to avoid those losses or costs. I chose to do my experiment on how I can convince horses to willingly eat their medication or in my experiment oats, by changing the bucket color, size and feeding time. In my opinion my results can avoid health risks and change the lives of many horses and horse owners because it's a cheap and kind way to solve the problem of medication rejection. To test my hypothesis I used three different horses, I went to the barn at 7 am and pm and scooped 1 ½ cup oats into a certain bucket. I timed and recorded the time for every horse. I repeated this until every bucket was tested (each bucket was tested 3 times per horse and all on different days).

b. Describe any special precautions you will take.

Risks that are taken into consideration and attention during this test are the safety of me and my adult supervisor working around the horses and the horses choking this is why I have chosen oats for testing. I have chosen oats for testing because oats are unprocessed (natural) and the softest un-soaked grain for animals which makes is a very low risk for choking.

c. Where will you carry out these experiments?

Gwinhurst Equestrian - 234 Marsh Hill Road, Quinte West, Ontario

d. Who will be your scientific supervisor, and what are his/her qualifications?

Jane Moodey is my scientific supervisor as she is my Albert College science teacher.

e. Where will you obtain the animals?

Pasture mates with my horse (Felicia)

f. How will they be cared for during your project?

The horses were treated as they would be treated when my project wasn't being tested because my project didn't affect their daily routine.

g. What will happen to the animals after your project is finished.

Nothing will happen to the horses after my project is finished because my project didn't affect their daily routine as they got fed with the same grain at the same time, just out of different buckets.

Advice or Ruling Ethics Committee



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Advice or Ruling from the Ethics Committee²

Policy 4.2.2 Use of Vertebrate Animals and Cephalopods in Research states in part:

7.1 Vertebrate animals, (i.e. fish, amphibians, reptiles, birds, and mammals), and Cephalopods (e.g. the squid, octopus and cuttlefish) may only be used in any science fair project, if they fall within one of the following four cases:

1. Observation of animals in zoological parks, farm animals, and pets is permitted. Observation of wild animals is permitted, except for those at risk. Species listed as *Endangered*, *Threatened* or *of Special Concern* by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) are not suitable subjects for research by science fair participants. (Ref. 6)
Vertebrate animals are not to be used in any active experiments which may be deleterious to the health, comfort or physical integrity of the animals.

This project is in compliance with this statement and is approved for participation at science fairs.

Signed

Digitally signed by Patrick Whippey
DN: cn=Patrick Whippey, o=Youth Science
Canada, ou,
email=patrick.whippey@youthscience.ca, c=CA
Date: 2017.03.30 12:03:28 -04'00'

Chair, Ethics Committee

² You must have a copy of this ruling available at your Project during Judging

Questions to be Addressed

2. Projects involving the participation of Humans

- a. Describe your proposed project in a paragraph or two.
- b. Describe any special precautions you will take.
- c. Where will you carry out these experiments?
- d. Who will be your scientific supervisor, and what are his/her qualifications?
- e. How many people will participate in your experiment?
- f. What are their age ranges?
- g. Include your Informed Consent Forms.

3. Projects involving the use of Vertebrate Animals and Cephalopods

Instructions

If your proposed science fair project involves the participation of humans or the use of animals, step one is to visit this web page so as to become familiar with the policies that apply: <http://youthscience.ca/node/835>

Step two is to seek advice from the Ethics Committee of your Regional Science Fair. Please use this form to make such a request. Send it by email to the Chair of the Ethics Committee or other official of your Regional Science Fair. If you cannot find the right email address from their web page, you can find a contact here: <http://apps.yssf-fsj.ca/fairlocator/>

In complex cases, the Ethics Committee of the Regional Science Fair may wish to seek advice and/or a ruling from the Youth Science Canada National Ethics Committee: ethics@youthscience.ca

Submit the form in .docx format, because the response will be written on it. Do not submit a scanned copy of the form, because this cannot be edited.

Students may not request a ruling directly from the National Ethics Committee.

The advice, and ruling, will be sent to the student(s), the chair of the RSF, or designate, and the chief judge.

It is the goal of the National Ethics Committee to respond to requests for a ruling within seven days. If you do not receive a response by then, please send a follow up email to ethics@youthscience.ca

You must have a copy of this ruling available at your Project during Judging