Tennessee Horseman

Unifying Horse Owners Through Science-Based Information

ANIMAL SCIENCE
UTIA INSTITUTE OF AGRICULTURE
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Not always all about "Beef"

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Coordinator; UT Beef and Forage Center

It's "not" all about beef at the UT Beef and Forage Center (UTBFC) located in Knoxville, Tennessee these days. Even though "beef" is the first word in our center's name, we conduct forage research and provide other services specific to the equine enthusiasts and owners in our state.

To help them decide what forage varieties grow best near them in Tennessee the UTBFC is conducting the 9th year of the forage variety trials. These are held at multiple locations across the state at UT Research and Education Units providing a good regional report on how a variety, or species, performs in different growing conditions. The reports can be found on UTbeef.com.

Forage Analyses

Another service that the UTBFC provides horse owners with is the ability to run forage analyses using Near-Infrared Spectroscopy (NIRS) technology allowing rapid processing of the forage samples sent into the Plant, Pest and Soil Center in Nashville. This collaboration has kept costs down for running forage samples in our state for the 4th year now. Over 8,000 forage analyses have utilized the center's lab and processing facilities for all types of livestock in our state, the US, and several places around the world. For horse owners providing more information such as starch, sugars, and digestible energy that wasn't available in a quick and cost effective way before.

Further Improvements

To provide confidence that the forage nutritive values reported are just as good as wet chemistry the UTBFC is a certified member with the National Forage Testing Association (NFTA). We will continue the annual NFTA certification process to assure that our wet chemistry and NIRS testing procedures meet industry standards to provide the best product we can for everyone using the UT Animal Nutrition and Forage Lab.

Additionally, we are a member of the NIRS Consortium, which is a collaborative group that provides the equations, specific to the forages and hays, used for NIRS nutritive value predictions. Our lab participates in the annual updates by providing Tennessee forage samples that help in making them perform better and currently serves as the hub for the NIRSC instrumentation and sample processing.

Forage variety testing and NIR analysis are just two ways the UTBFC strives to assist Tennessee horse owners. Support with forage information and management, as well as, rapid forage analysis using NIRS is enabling us to serve in a greater capacity. We work closely with the UT horse programs and that is where the "forage" part of our center comes into focus.

What's in your mineral block?

Zach McFarlane, M.S.
Graduate Teaching Assistant; University of Tennessee

Minerals are vital for a variety of biological functions. As such, minerals are classified as either macro-minerals or micro-minerals, with the latter often referred to as trace minerals. The macro-minerals include calcium, phosphorous, chloride, potassium, magnesium, sulfur, and sodium. The micro-minerals, or trace minerals, are comprised of copper, zinc, selenium, iodine, manganese, iron, and cobalt. Macro-minerals are essential for bone formation (calcium and phosphorus), pH and fluid balance (the electrolytes sodium, chloride, and potassium), nerve conduction, and muscle contraction.

The trace minerals play a role in various physiological functions, but they are involved mostly in enzymatic processes. (Table 1) Providing an inadequate amount of mineral can cause a deficiency, while minerals in excess can be toxic to the animal. Depending on the activity level, performance horses that excessively sweat can require a great deal more potassium, sodium and chloride than a horse that has little activity. Therefore, the most practical solution to address the variability of mineral content of feedstuffs and the difference in horses alone is to feed a mineral supplement.

Unique Needs

A horse's mineral requirements will vary depending on age, body weight, activity level, and physiological status, particularly pregnant or lactating mares. The horse acquires most of their mineral requirements from their diet. A solid companion for any horse owner is the "Nutrient Requirements of Horses" that was most recently updated by the National Research Council (NRC) in 2007. This publication provides lists of the daily mineral requirements and even the mineral content of common feedstuffs. Additional information published by University of Tennessee Extension provides a multitude of information that is beneficial for any horse owner. As such, these values are relatively consistent; however, the mineral content can drastically vary depending on location, mineral content of the soil, plant species available in pastures, stage of maturity of the plant when harvested, and a number of other factors. Therefore, knowing the nutrient composition of the forages available to the animal is imperative. Providing forage samples for lab analysis can give an accurate assessment of the quality of pastures or hay.

*Table 1: Minerals Needed in a Balanced Equine Diet and their Biological Function**

Macro Minerals	**Primary Biological Function**
Calcium	Bone mineral, muscle contraction
Phosphorous	Bone mineral, metabolism
Potassium	Cell to cell communication, pH balance
Sodium	pH balance, nerve activity
Chloride	pH balance, nerve activity, digestive secretions
Magnesium	Bone mineral, enzyme activation
Sulfur	Contained in many structural amino acids (proteins)
Trace Minerals	
Copper	Elastic connective tissue formation
Iron	oxygen transport
Zinc	Component of more than 100 enzymes
Selenium	Thyroid hormone metabolism, cell membrane function
Iodine	Thyroid gland function
Cobalt	Vitamin B12 synthesis
Manganese	Carbohydrate and lipid metabolism

*Developed from Nutrient Requirements of Horses (Sixth Edition), 2007

Supplementing the Diet

Mineral supplements are commercially available and there are a number of considerations when selecting a product. Good quality forage that is fed at an appropriate rate often contains an adequate mineral

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Weaning Woes: Methods to Prevent Stress and Promote Growth in Weanling Foals

Lacey Johnston, MS, PAS
UT Animal Science Equine Lecturer

As this year's foal crop nears weaning age, owners must decide which weaning method will provide the best opportunity for growth and success. While four to six months is the recommended age, several factors contribute to determining what is best for each mare/foal pair. Understanding the management strategies employed by successful breeders can contribute to a less stressful weaning process while also promoting growth.

Weaning Methods

There are three generally accepted methods for weaning: complete, incomplete, and gradual.

Complete weaning is an abrupt separation of mare and foal, confining them to a stall or field where neither can hear or see the other. However, research has shown a measurable increase in stress levels and suppressed immune function with this method. Foals often lose weight, become lethargic or depressed, develop stereotypies such as cribbing, or become aggressive.

Incomplete weaning involves separating the mare and foal, but allowing them to share a common fence line. They are able to see and touch each other, but the foal is not able to nurse. Another method of incomplete weaning is removal of one mare at a time from the field, until only the weanlings are left. These mare/foal pairs show less stress and immunosuppression than complete weaning due to companionship of other mare/foal pairs, and being able to interact with their dam through the fence.

The last method, gradual weaning, calls for separation of the mare and foal for increasing lengths of time. Traditionally done over a five-day period, it can increase labor and weaning time, but has been shown to be significantly less stressful for both mare and foal. Immunosuppression in these pairs is also significantly lower than complete weaning.

Companionship is key in any weaning scenario. Separating the mare and foal completely can be stressful and have a negative effect on the foal's overall health. Placing the weanling in an area with peers, or an older mare or gelding, decreases the frequency of these issues.

Foal Care

Weaning stress can impact a foal in many ways including general unthriftiness, immunosuppression, and stereotypy (vice) development. To prevent weight loss, foals should be offered a creep feed, or alternate food source that the mare cannot access, beginning at three months of age. Begin with high quality hay that has been analyzed for content, and add a balanced growth formula concentrate that is lower in carbohydrates. Increased consumption of carbohydrates, the major energy source in horse feeds, can promote growth in a way that can negatively affect foals.

Developmental Orthopedic Diseases (DODs) are often a result of high energy diets that cause rapid growth. Once these affects are seen owners tend to drastically decrease feed in an attempt to stop the problem, but this is not recommended. When the foal resumes a normal feeding schedule, compensatory growth, or the body's attempt to catch up, can occur and DODs can form as a result of inconsistency. Attention should be paid to joint swelling or angle changes in the limbs.

Due to increased immunosuppression, biosecurity measures should be strictly enforced around weanlings. Stress-induced immune response in foals

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Beat the Heat: Avoiding Heat Stress in Horses

Holly Evans
UT Agriculture and Natural Resources Extension Intern

Summer is here and in full swing. The sun is out, temperatures are high, and longer days allow for increased be more productiveproductivity iin our daily routines on the farm. Like humans, horses thermoregulate through sweating and evaproativeevaporative cooling. but nUnfortunately, normal regulatory processes can fail when other external factors are at play, such as extreme temperatures, and heavy workloads and dehydration. Impairment of the cooling process by any means leads to heat stress, . Heat stress is simply defined as the inability of the body to cool down through normal regulatory processes.

Who is at Risk?

All horses have the potential to be are at risk for heat stress. Horses that are underweight, over weight, heavily muscled, and/or geriatric are at higher risk. Similarly, horses that have had restricted access to water, no matter their body condition or workload are at increased risk as well. It is important to note that high temperature coupled with high humidity can affect reproduction and overall performance levels of horses. Any instance where the horse experiences greater stress levels will make the horse more susceptible to heat stress and related issues. For example, transporting puts a lot of stress on horses, especially when moving them into a new climate.

Levels of Severity

Early stages of heat stress begin with dehydration. Often, horses will have a slightly elevated body temperature of 1 to 2 degrees above normal. Horses experiencing dehydration will have dark urine or reduced urine output, appear dull or depressed, and display poor capillary refill and skin pinch test results. A decrease in heart rate will lead to recovery along with fluid and electrolyte replenishment. In most cases, dehydrated horses will return to normal after rest, hosing, and adequate fluid intake.

By definition, horses experiencing heat stress will have a temperature 3 to 4 degrees above normal. Overall perspiration will be greatly reduced or cease entirely, which in turn causes a decrease in thermoregulation. Horses will display rapid, shallow breathing and high heart rates despite rest. Skin will take 6 or more seconds to return to normal following the skin pinch test. Capillary refill time will take approximately 5 or more seconds and the mucus membranes will be dark.

The third and most severe stage is heat stroke. The body reaches critical temperature levels at 5 to 6 degrees above normal. Horses will appear to be weak, erratic, anxious, and disoriented. They will have difficulty in moving and some may collapse. The high body temperature will cause organ damage to vital structures such as the liver, kidneys, muscles, and brain. These horses need veterinary attention immediately.

Signs and Symptoms

Noticing the signs of heat stress are important to the health of the horse. Horses may display a number of the following signs or symptoms of heat stress:

- Dark urine or lack of urination
- Elevated body temperature
- Discoloration of the mucus membranes
- Long capillary refill time
- Dehydration
- Shallow, rapid respirations
- Irregular pulse
- Diminished or absent gut sounds
- Dull expression or appearance
- Muscle tremors
- Reduced sweating/no sweating

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What's in your mineral block?

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Supplementing the Diet

level. A complete feed or mineral supplement could be an option, but care must be taken to not overfeed the supplement. Generally, the feed is formulated to ensure the animal receives the required mineral content at a certain rate. All commercially developed concentrates are balanced for mineral and other nutrient content for the life or production stage that they are marketed towards. Correspondingly, it is important to know the mineral content of all of the feedstuffs in the horse's diet to guarantee that minerals are not overfed. Another supplemental option is providing a trace mineral salt, typically available in loose or block form. The idea behind trace mineral block supplementation is to encourage free choice for your horse. It is important to note that contratry to popular belief, horses cannot self-regulate mineral intake. For example, one horse will lick the salt block to the ground, while others will never touch them.

Utilizing a loose mineral form usually increases consumption significantly. Keeping the supplement fresh is also an important consideration, especially during the summer months with high humidity. High performing horses that tend to sweat heavily during the summer months need to replenish their electrolytes more often. If your horse is not ingesting the mineral at an appropriate rate, providing additional flavors can increase voluntary intake. Another option to consider, especially when traveling, is to add mineral to your horse's water supply to ensure they will drink. Add the mineral mix while still at home to ensure the horse is accustomed to the flavor and tase. Additionally, the location of the mix is something to consider, and the supplement can be moved around the pasture to also encourage intake.

Ultimately, mineral requirements are an important consideration for every horse owner. Being mindful

Photo Credit: My Horse University

Mineral blocks come in a variety of sizes and compositions. Be sure to check with your County Agent or an equine nutritionist to ensure your horse has adequate mineral intake.

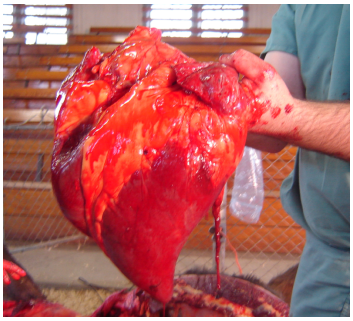
of the mineral content of the feedstuffs in a horse's diet is vital since the mineral requirements for individual horses can be so variable. Finally, developing a relationship with University of Tennessee County Extension Agents is an incredible benefit of the land-grant university system. Resources are available for guidance in any number of disciplines and the latest research and expertise is always readily available.

Find us on

Like us on Facebook to see what events are happening across the state! Look for us under Horse Programs at The University of Tennessee

Did You Know?

The average horse heart weighs between 9-10 pounds and is about the size of a basketball!



Weaning Woes: Methods to Prevent Stress and Promote Growth in Weanling Foals

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Foal Care

can last up to twenty-one days, and any disease exposure could compromise health. Keeping weanlings away from high traffic areas and eliminating exposure to new or unknown horses can decrease health risks.

Exercise is also important, especially if a complete weaning method is chosen and a foal is confined to a stall. Having turnout and an opportunity to exercise increases musculoskeletal and vision development. This also decreases the instances of stereotypy development such as cribbing, weaving, and stall walking. Foals should be handled while at the mare's side, but weaning provides an opportunity to increase handling and training time. Weanlings should be taught ground manners, leading, picking up feet, and standing for grooming and bathing for greater success later in life. Free lunging and jumping can provide exercise, a form of play, as well as preparation for training.

A protocol for vaccinations and deworming should be developed with a veterinarian, taking into account whether or not the dam was vaccinated prior to foaling. The two internal parasites that cause concern in foals are ascarids and tapeworms. Treatment for ascarids between two to three months, followed by a fecal egg count (FEC) at six months to check for additional parasites is highly recommended.

Mare Care

Mares will continue lactating as long as there is a stimulus for milk production. Mares should stop receiving grain approximately five days prior to weaning if they are still lactating heavily. After the foal has been removed, check the mare's udder daily. If she becomes uncomfortable or her udder is tight, milk a small amount to relieve the pressure, but keep in mind that continuous milking will further stimulate milk production. If the udder is still tight after four days, or redness, swelling, or temperature elevation occurs, she may have mastitis and will require treatment by a veterinarian. Behavior will vary among mares, some taking only hours to resume a normal routine while others may take several days. Special attention should be placed upon checking any area the mare will be confined to prevent injury if she attempts to search for her foal. Never return a mare to a foal after weaning, as lactation can be re-initiated and the process will have to be repeated. Also, providing companionship and exercise can assist in decreasing emotional stress.

Summary

Ultimately, the weaning method is up to the owner and capabilities of the facility, but keeping the mare and foal's welfare in mind will provide a less stressful experience all around. Consider health issues that could contribute to a foal's inability to cope with separation, and the possible impact it could have on overall health. Provide companionship to avoid stress induced behavior or immunity issues. Prepare the foal for a successful future by providing consistent, balanced nutrition for consistent, balanced growth. Work with a veterinarian if any issues arise, and follow recommended vaccinations and deworming protocols. Follow this recipe for success, and you are less likely to experience weaning woes.

Beat the Heat: Avoiding Heat Stress in Horses *(Continued from page 4)*

Monitor Your Horse

Often, heat stress can be prevented by early detection of dehydration and other abnormal vital signs. Understanding what is normal for your horse and can help prevent heat stress from happening, or from progressing from mild to severe. In order to assess your horse's overall condition, perform the following examinations:

Temperature: The normal temperature range for a horse is between 99 to 101 degrees Fahrenheit. To determine your horse's temperature, grab a rectal thermometer and apply adequate lubrication. Then, grasp the base of the horses' tail and move it out of the way of the rectum. Place the thermometer in the rectum and hold the end firmly or clip the end of the thermometer to the tail hair; don't lose it! Allow the thermometer enough time to finish reading then remove. Horses can and will vary in their average temperature so make sure you know what is normal for your horse. Horses that are experiencing heat stress will have an elevated temperature.

Pulse: The normal range for a horse's pulse is between 28 to 44 beats per minute. You can take your horse's pulse by standing on the left side of the horse and locating the transverse facial artery. The transverse facial artery can be found along the jawbone directly below the eye and is approximately the diameter of a pencil. Press your index and ring finger against the artery for 30 seconds and count the number of pulses. Multiply this number by 2 in order to determine the number of beats per minute. Do not use your thumb because you will feel your own pulse. Often, horses will throw their head if they are unused to palpation in this area; therefore, it is desirable to practice checking your horse's heart rate often to determine a baseline and to ensure accurate measurement. Heat stressed horses will have a rapid, irregular pulse that does not settle even with rest.

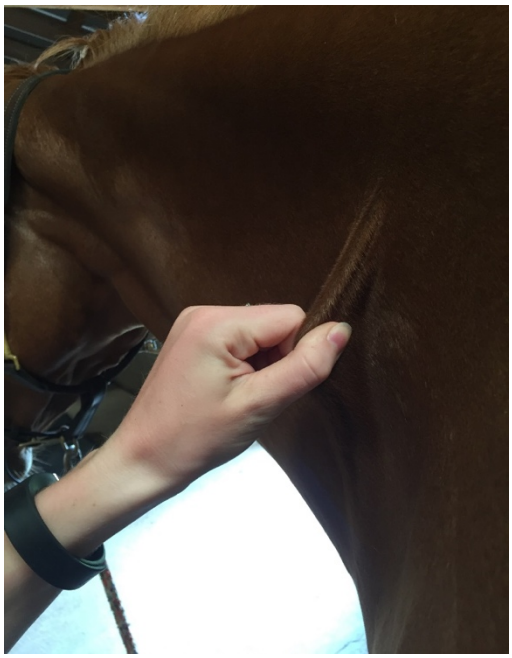
Respiration Rate: The average number of respirations or breaths per minute range from 10 to 24 breaths. You can do this by watching the flank of the horse as it expands and contracts when the horse is breathing. Alternatively, you can watch the horse's nostrils and count the number of times the horse completes an inhale/exhale cycle. Again, count this over a 30 second period and multiply by 2 to determine your respiration rate. Be sure to count true breaths; a horse that is sniffing will appear to have a much faster respiration rate based on the movement of their nostrils alone. The respiration rate of a heat stressed horse will be high even with rest. Each breath will be very quick and shallow.

Mucus Membranes: Check your horses' eyes, nostrils, and mouth. A healthy horse will have moist, pink mucus membranes. Horses' eyes should be clear and free of mucus or debris. Heat stressed horses will have dark, red, dry or otherwise discolored mucus membranes.

A capillary refill test is conducted by pressing on the gums and releasing, taking note of the time for blood to fill the pressed area. Notice the healthy, pink coloration of the gums.

Capillary Refill: The normal capillary refill time is 1 to 2 seconds. To test this, simply press your thumb

against your horses' gums then release. Observe the amount of time that it takes for the gums to return to normal (pink). Capillary refill will take more than 2 seconds and the timing will range with severity of heat stress and dehydration.



A skin pinch test can be a quick assessment of the horse's hydration level.

Skin Pinch Test: Gently grasp the skin of the horses' neck in front of the shoulder and pull it towards you. Release the skin and observe. On a healthy horse, the skin should bounce back into place within a few seconds. If the skin remains raised or takes several seconds to return to normal, the horse could be dehydrated.

Treatment and Cool Off

If a horse is demonstrating signs of heat stress, begin by hosing the horse with cool or cold water to aid in bringing the horse's body temperature back to normal. Additionally, offer free access to water; contrary to popular belief, horses can have as much water as they would like without risk of colic. Continue to hose the horse and scrape away the water until skin is cool to the touch. Scraping water off the horse aids in the cooling process and prevents water warmed by the horse's body temperature from trapping heat.

If you are riding or exercising a horse that succumbs to heat stress, immediately dismount and remove any equipment. Move the horse into a shaded area and hose with cool or cold water. Hand walk the horse for several minutes to help the muscles continue to remove any waste products built up from exercise. Repeat hosing and scraping to allow for evaporative cooling of the body. Again, allow the horse to have free access to water, do not restrict intake.

In both cases, re-evaluate the horses' temperature every 15 to 30 minutes. Ideally, the horses' body temperature will decrease by 1 degree every 30 minutes until it returns to normal temperature range (Loving, 2003). When in doubt call your veterinarian. Heat stress can be a serious condition which warrants professional veterinary attention. In extreme cases horses will need intravenous fluids to help their body return to a stable homeostatic environment.

Preventative Management

There are many simple ways to prevent heat stress in your horses and other equines. Keep horses in the barn/shade during the hottest hours of the day, removing them from direct sunlight. Box fans are an easy and inexpensive addition to any stall or barn to increase air flow and assist in the cooling process. If you do not have stalls for your horses be sure to provide adequate run-in shelters or tree coverage for shade in paddock space. Always provide plenty of fresh, clean water.

When riding or exercising your horse, avoid the hottest daytime hours. If the heat index is 90 F or below, your horse should be able to complete a normal exercise routine and cool down. At 90 to 100 F, take caution and monitor the horse closely. Do not prolong exercise because both you and your horse are at higher risk for heat stress. When the heat index is above 100 F, avoid exercising your horse. Wait until the temperature cools off or use a climate-controlled area.

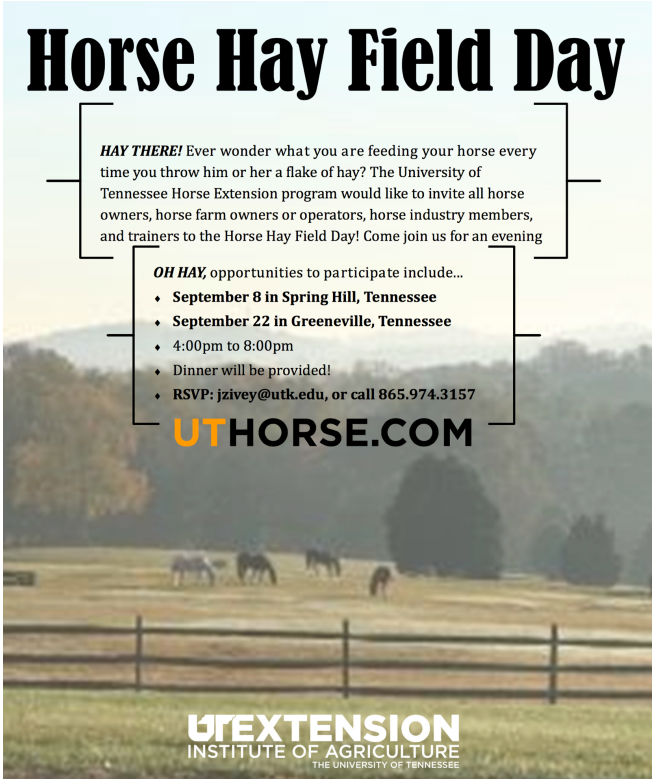
Loving, N. S. (2003, July 1). Heat Stress in Horses. Retrieved July 7, 2016, from http://www.thehorse.com/articles/13991/heat-stress-in-horses.

Equine Program Updates

Check out the new opportunities for education and programming from UT Equine Extension!

Tennessee Master Horse Program

UT Extension is starting a new, revitalized Tennessee Master Horse Program! Public programs will be held in the Eastern, Central and Western Regions of Tennessee during October 2016! Visit UTHorse.com to find out more information and reserve your spot!



Tennessee Equine Census

Leave Your Mark

Do you own horses, ponies, mules, donkeys or burros? Are you an equine-business owner? UT Extension needs your help! Over the next year, UT Extension will be conducting a survey to determine the impact of the equine industry across Tennessee. Go to **UTHorse.com** and complete the census to ensure your equids, business and land are counted!