Help Your Horse Handle Heat and Humidity

Introduction
Summer is the primary season for many equine competitions, and intense exercise coupled with a high ambient temperature can quickly put horses in the danger zone for heat related illness. In this article, we will discuss heat related illness, physiological mechanisms of heat loss, and techniques for relieving heat stress in equines.

Overview of hyperthermia
Before we go into greater detail, it is necessary to define some basic terms related to thermoregulation—or the regulation of body temperature. The normal rectal temperature of the horse ranges from 99 to 100.5°F, and the natural thermoregulatory mechanisms of the horse are capable of maintaining this normal body temperature except when overwhelmed by severe circumstances such as disease or intense exercise in hot climates. Hyperthermia (heatstroke) occurs when the core body temperature starts to rise because these innate systems can no longer effectively cool the horse. Heatstroke is a serious condition that if not dealt with quickly can be fatal. The most common clinical signs include: an elevated respiratory rate of 40-50 breaths per minute (normal at rest = 8 to 16) that does not slow when at rest, a heart rate of 80 or more beats per minute (normal at rest = 36 to 44) that does not slow down after a few minutes of rest, a rectal temperature of over 103°F (normal at rest = 99 to 100.5°F), lethargy, and/or profuse sweating or an absence of sweating altogether. Some horses may suffer from a condition called anhidrosis which is a disorder where the horse does not sweat normally. These horses are especially prone to hyperthermia if not managed appropriately. The specific cause of anhidrosis is unknown; however, it is thought that there is a physiological defect at the level of the sweat gland that inhibits sweating. Your veterinarian can perform diagnostic tests that can confirm this condition of you suspect that your horse might be afflicted.

Hyperthermia most often occurs as a result of inadequate physical conditioning (poor fitness), extreme hot and humid conditions, a weakened thermoregulatory system, or a combination of the three. The heat index, (HI) = temperature (°F) + humidity (%), gives a means of assessing the danger that extreme environmental conditions pose to horses performing intense exercise in such an environment. If the HI < 130 (e.g., 90°F and 20% relative humidity), then the horse’s built-in cooling mechanisms are usually capable of dissipating the excess body heat generated during exercise. However, when the HI > 150 (e.g., 100°F, 60%+ relative humidity), the horse will probably need assistance in order to prevent heatstroke. Owners should proceed cautiously when, or seek alternatives to, exercising horses in situations where the HI > 170 or the relative humidity is above 75% as these conditions severely diminish the effectiveness of the horse’s innate thermoregulatory systems.
Mechanisms of heat regulation or heat loss

In order to maintain a normal body temperature the horse must dissipate heat that is produced as a result of normal body processes (e.g., digestion and muscular exercise). There are four main mechanisms that allow for this: evaporation, conduction, convection, and radiation. Evaporation (sweating) is the most important cooling mechanism for the horse as it removes heat as water (sweat) changes from a liquid to a gas (water vapor). Conduction occurs when heat is transferred from a hotter object to a cooler object by direct contact, such as when an injury is treated with an ice pack on a sprain. Convection is heat exchange that occurs when an air current moves over the skin to pick up heat and/or moisture from the skin and carry it away. Radiation occurs when infrared rays carry heat from a hotter object to a cooler object. The heat that we feel from the sun is an example of radiation. We will describe the practical significance of these mechanisms later in this article when we discuss means of relieving heat stress.

How to prepare your horse for a heat stress environment

“Prevention is the best medicine.” This goes for heat stress in horses too. If at all possible avoid strenuous exercise of horses when the heat index is near the danger zone. This may require adjusting your training/exercise schedule where intense work is done early in the morning or late at night when ambient temperatures are lower. If you must work a horse in a high heat index situation, take extra precautions to prepare the horse for the challenge. First, make sure that the horse is physically fit and accustomed to the exercise program. Also, make sure that the horse does not suffer from anhidrosis before putting them in a potentially dangerous situation. Second, take frequent breaks that allow the horse to return to a resting heart and respiratory rate. Third, make sure that the horse has adequate access to clean, fresh water and salt through their normal diet in order to prevent dehydration during intense exercise. If you expect that your horse will be worked sufficiently to sweat profusely and “lather up”, you may wish to provide an equine electrolyte supplement according to the manufacturer’s directions. If you add electrolytes to their water, make sure that they also have access to plain water without any, and be sure to accustom them to the electrolyte water before trying it out in the heat stress setting. Finally, accustom your horse to the active cooling methods described below (such as a cold water bath with a sponge and garden hose) so that they are not frightened by the procedure. And, make sure that you are able to consistently monitor your horse’s vital signs (rectal temperature, heart rate, respiratory rate, and hydration status) so that you can determine if they are entering a “danger zone” in regard to heat stress.

Means of relieving heat stress

During intense exercise in a high heat index, the horse’s rectal temperature may exceed 103°F. Therefore, it is crucial to monitor your horse’s vital signs. If the horse has a normal recovery to exercise, then the heart and respiratory rate should be near normal after 30 minutes of rest following exercise. While rectal temperature may actually rise in the first 5-10 minutes post-exercise as the horse dissipates the heat generated during exercise, the horse’s rectal temperature should begin to decline within the 30 minutes of rest following exercise. If this does not occur or if the rectal temperature is over 105°F, this is a cause for concern and methods described below should be used as well as seeking veterinary guidance if available.

The primary goal is to lower the horses body temperature as rapidly as possible, and this is best done employing “active cooling” methods that make the most efficient use of the heat loss mechanisms described previously. Once the horse’s rectal temperature has dropped below 103°F, active cooling can be reduced and the horse can be walked leisurely until all vital signs are normal.

Cool water bathing. The primary purpose of this is to maximize conductive heat loss. The most efficient method is a cool water bath with a garden hose or a sponge and bucket. The goal is to cool the blood in the major vessels along the neck, on the belly, and inside the legs. If water is not limited, then you can apply it to the horse’s entire body taking care to not get it in their nostrils or ears. If water is scarce, then
towels wetted with a 50/50 mixture of water and rubbing alcohol might be helpful. The cool water will “take up” body heat as it is warmed, so the water will need to be scraped off with a sweat scraper in order to remove the heat. This situation might require a team of three people: one to hold the horse, one to hose or sponge water onto the horse, and one to scrape the warmed water off of the horse.

**Increase air flow** over the skin by standing the horse in front of a fan or in a natural breeze if available. Recall, convection pulls heat and moisture away from the skin allowing it to cool.

**Shading** the horse out of the sun can minimize heat gain from the sun’s radiation and help maximize the heat loss gained by convection and conduction.

**Drinking cool water** can help with conductive heat loss while restoring the body fluids lost in sweat. Sweating results in a significant loss of body fluid, so it is important to monitor the horse and insure that normal body fluid levels are maintained. Horses with mild dehydration (less than 4% body fluid loss) typically show no visual signs. Horses that are moderately dehydrated (4+ to 9%) will show decreased skin elasticity (skin pinch test), poor capillary refill time of the gums, reduced saliva production, sunken eye sockets, muscle weakness, and fatigue. We have all heard “you can lead a horse to water, but you can’t make him drink.” This is all to true, but research has shown that providing horses with a normal saline solution (0.9% saline or 2 tablespoons of normal table salt per gallon of water) to drink might encourage them to drink more and further aid in replenishing their body fluids. This is definitely a case where “more is not better.” Be sure to provide the proper amount of salt in the saline solution, and provide a bucket of plain water without any salt too. Another study compared voluntary water intake of exercised horses that were offered water at three different temperatures (50°F, 68°F, and 86°F). Results showed that the greatest intake of watered occurred when the temperature was 68°F. Offering a cool normal saline solution (68°F) can help restore body fluids while cooling the horse via conduction (cool water inside hot horse) as well. While it is not a good idea to allow a hot horse to consume an unlimited amount of water as this may lead to colic, it is important to note that an 1100 lb. horse that has a 5% loss in body fluid would require approximately 5 gallons of water to restore this loss. So, it is advisable to allow the horse to voluntarily drink 2 to 3 gallons of water at a time separated by 10 or 15 minute intervals until the horse is no longer thirsty.

**Conclusion**

The key steps in helping horses handle heat and humidity are to:

1. determine the potential for heat stress using the heat index criteria given,
2. make efforts to minimize strenuous work in these conditions,
3. be able to recognize the signs of hyperthermia in horses,
4. understand how the horse’s body cools itself,
5. and be able to employ active cooling methods in a critical heat stress situation.

Knowledge of these guidelines and methods will help you look out for the well-being of your horse during the hot, humid days of summer.

**References**


UPCOMING EVENTS

Sept. 9 – 25 - New Mexico State Fair – Albuquerque
Sept. 28 – Oct. 2 - Southern New Mexico State Fair - Las Cruces
(Tentative)
Sept. 24th – Valles Calderas Field Day

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