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What Would be the Best Method for Cooling Horses Under Heat Stress and Why?

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Abstract

In this practice-oriented paper heat stress in horses is addressed, with emphasis on heat stress signs, testing tools, and cooling methods. Different cooling methods appear to be non-effective. Appropriate cooling systems are not easy to find. Cooling horses require the application of three principles: cooling immediately, rapidly, and appropriately. This can be achieved by using large quantities of cool/cold water and at the same time by activation of fans. Water and fans increase the evaporation of heat from the skin of the heat stressed horse. It is advised to monitor before, during and after cooling several parameters for easily checking the presence and severity of heat stress as well as the effect of cooling. When these parameters are back to normal values, cooling can be stopped.

Introduction

Heat stress is a phenomenon which occurs frequently in different equine competition domains, when ambient conditions are such that heat stress can be expected. Endurance competitions are the best example, but other disciplines, such as cross-country, dressage and jumping can also show heat stressed horses.

There are different reasons why these horses become heat stressed. Among these are the geographical climatic conditions (e.g. dry tropical climate or humid hot climate), the susceptibility of the horses (depending on genetics, intensity of the performance, the fact whether horses have been trained for such conditions, metabolic rate).

The best way to assess the level of heat stress is using a Wet Bulb Globe Temperature test (WBGT-test). The advantage of this test is the fact that in addition to ambient temperature and air humidity, also other contributing factors are measured: windspeed, heat reflection from the ground, solar radiation. These renders the test quite reliable in comparison to other tests such as the temperature-humidity test (THI) or Heat Index which lack the forenamed factors. The read-out of WBGT is in °C or °F, but the temperature results should not be confounded with the ambient temperature.

WBGT is used at FEI-competitions to check whether a competition can be started or should be stopped; the latter of course when conditions would probably cause welfare and health problems of horses. For example, when the morning WBGT test result yields 28°C or more, measures must be taken to limit the effects of heat stress.

The action to be considered when confronted with a horse in heat stress is to cool down the affected horse. There are currently many different methods for trying to cool a horse. Many of these are applied by good intention, such as putting water on the horse with a garden hose, using a watering can or installing misters (foggers). But they are laborious, very time-consuming and counterproductive.

When to Start Cooling a Heat Stressed Horse?

The basic principle is to cool such a horse when it shows signs of heat stress. This especially urgent when the horse at the finish of a competition shows severe signs of heat stress. Table 1 presents the most relevant signs of heat stress in a horse.

Table 1: The most relevant signs of heat stress in a horse

Decreased activity level*	Increased heart rate (> 65 bpm)*
Decreased feed intake	Increased respiratory rate (>40)*
Decreased performance*	Stiff gaits & swollen body parts
Ataxia & behavioral changes	Diaphragm beats in the flanks
Diarrhea and/or colic	Lung edema
Less elasticity of skinfolds*	Dehydration (gums loose color)*

(bpm = beats per minute; * = the major parameters for heat stress assessment)

When a horse presents several signs of heat stress named in Table 1, it must be cooled immediately, even when no competition is at hand. An even more so, when a horse has finished a competition (or an intensive training) and shows those signs at the finish. Cooling must be done immediately and rapidly for safeguarding health.

Cooling a horse means increasing the evaporation of heat from the skin.

Important clues for cooling are (1) to use cool/-cold water in quantities and (2) to install fans, both covering the whole horse's body. The combination of cool/cold water and fans running at the same time yields the best results of cooling.

Elementary measures, for example in the country-

side, concern putting the affected horse in a cool/cold water stream, in the shade, walking him around calmly and giving him to drink small portions of cool water regularly. If he refuses to drink, one may consider adding apple juice to the water, hence increasing attractiveness of the water.

Cooling a horse, applying water using a garden hose, emptying bottles (!) of water on the horse, or throwing water with buckets on the horse are laborious and too much time-consuming, large volumes of water are not used, while it is not always sure that the water is indeed cool/cold. Moreover, fanning is most often not applied. These methods are hence not very effective.

What about the misters (foggers) that could be seen at the last World Equestrian Games in Tryon, USA?

The big difference between large volumes of water through an appropriate cooling system and using misters is that the former always produce large water droplets (imitating natural rainfall), while the latter always produce small water droplets, which sometimes stay on the haircoat of the horse, in spite of the fan. The cooling effect of large water volumes with simultaneous fanning is much greater than that of misters.

But, on the other hand, misters can be used in the horse stable to cool down the air in the stable. This improves the respiration of the horses under hot conditions. Misters can also be used for cooling humans (head, arms, legs) because it feels nice.

Figure 1: An example of the ECU, equipped with a special sprinkler on top, and two fans at the back poles.

The ECU (and the cooling Carousel) are patented.

What are Appropriate Cooling Systems?

There are not many appropriate cooling systems. The simplest found during a competition, but not effective, is a ''walk through'' system where-in horses pass under a series of misters. To gain some effectiveness one may make the ''walk through alley'' much longer, but it is still missing large volumes of water, as well as any fanning! The wind may blow the small droplets away.

The most recent cooling system is the so-called Equine Cooling Unit (ECU). This ECU is based on a standard horse stand, has a specific sprinkler yielding great volumes of water in large droplets, and two fans at the back which turn at rather low speed (5-7 mph). Water and fans run simultaneously for -say- 5 to 15 min. The 5 min is mostly quite enough.

The cooling units can be combined into so-called Cooling Carousels with 6, 8 or 12 ECU's. All run simultaneously or individually, as governed by an electronic control system. The specific sprinkler is not at all comparable to sprinklers in companies, offices, or supermarkets; these sprinklers spread the water widely. The design of the ECU-sprinkler is such that hardly any water is spoiled. All water is used for cooling the horse. The cooling water can be recycled after filtering and cooling again.

Discussion and conclusions

Heat stress in horses is an underestimated phenomenon. Many horse owners, riders and grooms lack knowledge and skills to detect it at an early stage. Moreover, current cooling methods applied do not meet the requirements of proper cooling: immediate, rapid, appropriate cooling. Appropriate means using large volumes of cool/cold water and running fans at the same time.

One can check the effect of cooling by handling a clinical scoring list. If all parameters are back to normal value, one can stop cooling, if not, one needs to continue with another cooling cycle. The scoring list with pictures is available on request to the author by E-mail. Note that there is not one single test to be sure about heat stress in a horse. Therefore, several parameters are to be addressed at the same time.

A horse, which is cooled appropriately, may have a relapse one or two hours later, so the horse must be checked again to be sure the horse is okay.

Note that Cooling Carousels are also highly fit for international competitions and large horse stables.

Thoroughbred racehorses are not addressed in this paper. The reason is that they might show severe signs of central nervous system dysfunction, after a highly intensive, explosion-like race performance [1] and will need attention separately. Information and scoring sheets for such Central Nervous System dysfunction, and its treatment can be found in [2]. Heat stress in humans (riders, grooms) is not addressed here neither. This is also addressed in [2], where-in humans under heat stress are presented in detail. Their symptoms and their treatment and prevention.

Consulted literature

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