Heat Stress and Horses

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Owners of competitive horses carefully monitor their horses before, during, and following exercise in hot, humid environments to either avoid or quickly manage heat stress. To help, many competition venues have veterinarians on staff to

manage heat stress. To help, many competition venues have veterinarians on staff to identify horses struggling with the heat and provide various forms of cooling options—a cache of ice, misting stations, low-temperature tents. Nonetheless, athletic horses are all too frequently excused from competition for not performing well in the heat. To help horse owners, trainers, and veterinarians better understand heat stroke, which is more accurately referred to as "equine heat exertional illness," Australian researchers published a comprehensive review* on the topic, including detailed recommendations for rapid and effective cooling.

"To begin, the researchers explained that the muscles of an exercising horse generate an impressive amount of heat, capable of increasing a horse's core body temperature by as much as 1.8° F each minute," shared Kathleen Crandell, Ph.D., an equine nutritionist with Kentucky Equine Research.

The horse's body has several mechanisms in place to dissipate heat and maintain a normal body temperature: radiation, convection, and evaporation. For example, heat evaporates from the lungs and also from the skin through sweating. In hot, humid temperatures, however, when the ambient temperature is the same as the horse's body, a horse's normal cooling mechanisms become ineffective. Once the core body temperature increases a mere 5-9° F, exceeding 107° F (41.6 C), a complex series of events occurs in the horse's body in an attempt to thermoregulate.

Blood flow to the skin is maximized to help dissipate heat. As a consequence, blood flow to the intestines decreases, causing "leaky" intestinal passage and allowing bacteria to enter the bloodstream. At the same time, the decreased blood flow to the brain causes a blood-brain barrier breakdown, swelling of the brain, and injury to the nerves. In addition, there is direct damage to cells simply due to the increase in temperature they are exposed to. Cells lining blood vessels malfunction, contributing to formation of blood clots and disseminated intravascular coagulation. The severity and signs of this condition can be summarized as follows:

Level 1: Mentation is normal but horses are hot and distressed, sweating profusely with a heart rate >150 beats/minute.

Level 2: The horse is irritable and uncooperative, frequently kicking and head-shaking in a random fashion with subtle gait abnormalities.

Level 3: Depression and disorientation is obvious and incoordination is present.

Level 4: Central nervous system dysfunction can proceed to loss of consciousness, convulsions, coma, and death. Endotoxemia, or the presence of bacteria and toxins in the circulation, manifests as bright red mucous membranes and prolonged capillary

refill times.

Choosing to exercise in the morning or evening instead of mid-day is ideal, but if heat exertional illness develops, the researchers recommend the following:

- Apply ice and cold water directly to the horse's body, focusing on the large blood vessels in the head and neck, abdomen, and large muscles;
- Frequently scrape off the water, because it will warm up quickly on the horse's body, and repeat. A rapid decrease in body temperature is achievable if caught early and managed aggressively, using a team of three people—one to ice, one to hose cold water, and one to scrape off water.
- Have a veterinarian sedate the horse, if necessary, to ensure it is not a danger to itself or others; and
- Consider veterinary administration of anti-inflammatories (glucocorticoids, nonsteroidal anti-inflammatory drugs) and intravenous fluids.

"Be sure to appreciate that equine heat exertional illness is different from anhidrosis and any horse, not simply nonsweaters, are at risk in hot, humid environments," reminded Crandell.

While water is certainly the most important nutrient for horses in the heat, electrolyte supplements such as Restore SR and Restore Paste are also advocated to help replenish those lost in sweat. In Australia, the product is sold as Restore. KER Australia also offers Drink-Up to aid hydration. Race Recovery, available in the U.S. and other markets, is suitable for horses that train and compete on furosemide.

*Bornlow, M.A., A.J. Dart, and L.B. Jeffcott. 2016. *Exertional heat illness: A review of the syndrome affecting racing Thoroughbreds in hot and humid climates*. *Australian Veterinary Journal. 94:240-247.*

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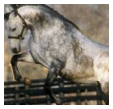

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