PERCENTUAL OF BODY WEIGHT LOSS OF HORSES SUBMITTED TO ENDURANCE EXERCISE

(*PORCENTAGEM DE PERDAS DE PESO EM CAVALOS SUBMETIDOS AO ESFORÇO DE ENDURO*)

RESUMO

O objetivo do presente estudo foi de avaliar aporcentagem de perdas de peso sofridas por cavalos submetidos a provas de enduro de 20, 40, 80 e 160 km de distância sob clima tropical no Brasil. Os animais foram pesados antes, durante e após as provas com a utilização de uma balança portátil. Notou-se percentuais de perdas de peso de 3,47±1,86%, 5,93±4,35%; 4,69±2,01% e 4,53±2,11%, nas provas de 20, 40, 80 e 160 Km, respectivamente. Tais valores foram significativamente maiores nas primeiras aferições de peso, quando comparados com os pesos iniciais, e uma importante redução de perdas na continuidade das provas, provavelmente devido um melhor condicionamento do animal além do livre acesso a água e feno durante os períodos obrigatórios de descanso. A utilização de balanças portáteis deve ser estimulada em provas equestres de longa duração, como uma ferramenta de monitoramento de perdas de peso imperceptíveis por veterinários durante as competições. Os resultados obtidos revelaram que os animais devem ser condicionados a beber água e se alimentar durante esforços prolongados.

PALAVRAS CHAVE: Clima. Desidratação. Balança. Equinos.

SUMARY

The purpose of this study was to evaluate the percentage of body weight loss suffered from horses submitted to endurance rides of 20, 40, 80 and 160 Km distance in Brazilian tropical climate. The animals were weighted before, during and after the competition, with a portable scale. It was noticed that percentual body weight losses were 3,47±1,86%, 5,93±4,35%; 4,69±2,01% and 4,53±2,11%, in 20, 40, 80 and 160 Km rides, respectively. These values were higher after the first checking point, with an important reduction throughout subsequent rings of rides, probably due to a better animal condition and free access to water and forage, during the mandatory rest periods. The use of portable scales should be used for prolonged rides as a tool for veterinarians to monitor insensible body weight losses of horses in this kind of exercise. Data also revealed that horses should be conditioned to eat and drink during prolonged exercises.

KEY WORDS: Climate. Dehydration. Endurance. Scale.

INTRODUCTION

The sport of endurance riding is a competitive ride taking place over 80 to 160 Km long, divided into phases, where the winner is the horse and rider who successfully complete the course in the shortest time (TRIGO et al. 2010). Of all equine competitions, endurance races have the greatest metabolic demands for the sport horse, requiring substantial energy production for many hours (TREIBER et al. 2006).

The major way of heat dissipation during endurance is sweating through the evaporative cooling process (TEIXEIRA NETO, 2006), that leads to a considerable loss of body fluid (CARLSON, 1983). Despite the presence of effective heat dissipation mechanisms,

63 the potential for the development of heat stress increases when: i) the horse is inadequately
64 conditioned for the athletic endeavor being undertaken; ii) exercise is performed under
65 adverse ambient conditions; and, iii) when thermoregulatory mechanisms within the horse are
66 impaired, for example, anhydrosis (HODGSON et al. 1994). Thus, the animal is susceptible to
67 develop the exhausted horse syndrome that may lead him to death, in extreme cases.

68 According to Carlson (1983), during an endurance ride of 160 Km, the estimated body
69 weight loss was up to 10%, considering that approximately 90% of this loss was water. For 80
70 and 160 Km rides, body weight losses of 3 or 4% are common and may persist beyond the
71 period of one night recovery (SCHOTT II et al. 1997). Teixeira Neto et al. (2006) showed
72 losses up to 5% in 100 Km endurance rides, taking 72 hours to recover the body weight loss
73 in a group of horses in Brazil.

74 In a similar study performed by Schott II (2010), between competitors in rides ranging
75 from 80 to 160 Km, it was found that eliminated horses generally lost higher percentage of
76 their body weight in relation to animals that successfully completed the rides. It was also
77 suggested that horses that had higher percentage of body weight loss were not the ones that
78 lost the most weight, but those who could not replace them, by ingesting food and water
79 during the rest periods throughout the races.

80 As occurs in human athletes, the body weight loss suffered by horses during prolonged
81 effort has been considered an accurate estimation of fluid losses through sweating
82 (KINGSTON et al. 1997). Therefore, the aim of this study was to monitor body weight loss
83 suffered by horses undergoing endurances rides of 20, 40, 80 and 160 Km long.

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85 **MATERIAL AND METHODS**

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In 2011, competitions courses of 20, 40 and 80 Km distance long were monitored, in Brasilia Endurance Federation calendar. A total of 55 Arabian and Arabians cross breed horses (mares and geldings), that successfully completed rides were weighed. The 20, 40 and 80 km rides were performed in one, two and three rings, respectively, with distances varying from 21.5 ± 0.71 to 26.5 ± 0.71 Km. In 2012, 18 Arabian horses were submitted to a 160 Km ride (CEI3*). From those, just 11 completed the task with a mean speed of 17km/h in a moderate weather (17 to 26^{o}C, 60 to 70% relative humidity).

The animals were always weighed before (pre-ride), during (after each ring, right after the vets' checkpoint) and at the end of each ride. To monitor horses' weight before, during and after ride, a portable scale was used and the percentage of body weight losses were mathematically obtained after body weight determinations. This research project had the approval from the University Animal Ethics Committee (UnB 53699/2011) and all owners and riders agreed to have their horses weighted throughout endurance rides.

For statistical evaluation, analysis of variance (ANOVA) was done followed by Tukey's test, for difference verification of body weight loss throughout rides, with significance data when $p < 0,05$.

RESULTS AND DISCUSSION

Data of body weight determinations of horses throughout rides are shown in Table 1. Horses that competed 20km distance rides, were lighter ($p<0,05$) than all other horses at the moment before respective races. Although all horses lost significant body weights at the first checkpoint when compared with pre ride values, these losses were not different ($P>0,05$) throughout rides.

Changes in body weight can be used as an indicator of loss by sweating. About 90% of weight differences observed during endurance can be attributed to water loss (MEYER et al. 2005; CARLSON, 1983). The electrolytes loss through sweat and water are inevitable and depend on the duration and intensity of physical effort and environmental conditions (COENEN, 2005). In exercises achieved under moderate environmental conditions (low temperature and humidity) or when held at lower speeds, it was noticed decrease in sweating rate and increase in water and food intake, minimizing the percentage of body loss (SCHOTT II, 2010).

Significant body weight losses in all rides were observed, with the largest percentage occurring after the first weighting point ($P<0.05$). Similar results were also observed in several papers (BARNES et al. 2010; TEIXEIRA NETO, 2006; SCHOTT II et al. 1997). Water is also lost in urine, feces and an insignificant loss occurring by evaporation across the skin and respiratory tract (SCHOTT II, 2010). Losses tended to remain stable or decrease in subsequent rings, since there was water intake by horses throughout rides, from the second ring. Fluid losses lead to an increase in plasma osmolality, which cause a primary stimulus to thirst. Several times, this rate of water intake is associated with food and may compensate fluids and electrolytes losses, and some animals may even finish the race heavier than the beginning of the competition (KINGSTON et al. 1997; SCHOTT II et al. 1997).

There were total body losses of 3,47 ± 1,86, 5.93 ± 4.35%, 4.69 ± 2.01% and 4.53 ± 2.11%, in 20, 40, 80 and 160 Km tracks, respectively. Studies that had measured body mass loss in horses competing in endurance events found average values ranging from 3-7% by the end of the competition and according to Schott II et al. (1997), the depletion may persist for 24 hours after the ride (SAMPIERI et al. 2006). Overall, the value of ~5% body mass loss is approached by the end of endurance rides, somewhat, regardless of the competition distance and duration. This body mass develops despite the fact that horses have been offered water

and feed at various rest stops to promote fluid, electrolyte, and energy replacement (SCHOTT II, 2010).

Schott II (2010) also suggested that animals with higher body mass losses during competitions were not the ones that lost most body fluids, but those who failed to reset the fluid losses. The present study corroborate this hypothesis because horses that completed 80 and 160 Km rides had lower losses than those who finished 40 km rides, suggesting that animals of longer rides had more time to replace fluids losses due to longer exercise, and they were supposed to have better conditioning for fluid replacement. It may also be assumed that horses that run shorter distances, such as 40 km rides, should be more required by riders, with higher speeds, increasing effort intensity, with lower conditioning abilities to replace fluid losses. Barnes et al. (2010), affirmed that horses whose did not eat neither drink water during tracks may develop, for example, ileus problems, among other metabolic problems that lead the animal to its elimination from the endurance ride. It is well accepted that decreases in appetite and drinking are major warning signs to prevent the animals from exhaustion. Consequently, riders and support teams should share this information with veterinarians to control these events and also need to recognize that they share the responsibility for identifying horses at risk of exhaustion (SCHOTT II, 2010).

Body weight loss was significantly higher at the beginning of endurance ride and horses should be trained to replace fluid losses, throughout rides, during stop points to avoid clinical problems related to dehydration due to prolongation of the exercise that may culminate in the elimination of the competition.

CONCLUSIONS

Endurance exercise leads even finalists horses to significant body weight losses and horses shall be monitored or even conditioned to drink water throughout rides to avoid clinical problems related to dehydration.

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