

# Health and Welfare of Stabled PMU Mares Under Various Watering Methods and Turnout Schedules: 2. Behavior

S. M. McDonnell, PhD; D. A. Freeman, DVM, PhD; N. F. Cymbaluk, DVM, MSc; Beth Kyle, MSc; H. C. Shott II, DVM, PhD; and K. W. Hinchcliff, BVSc, PhD

Tie-stalled pregnant mares exhibited similarly normal behavior whether they were watered continuously or by any of three interval watering methods and whether they were provided daily, weekly, or biweekly (every 2 weeks) paddock turnout exercise. All were free of classic stereotypies and other abnormal behavior, which is consistent with observations that tie-stalled horses exhibit lower than equine industry average rates of behavior problems. Authors' addresses: Section of Reproductive Studies, New Bolton Center, University of Pennsylvania, Kennett Square, PA 19348 (McDonnell); Dept. of Veterinary and Animal Sciences, Paige Laboratory, University of Massachusetts, Amherst, MA 01003-6410 (Freeman); Ayerst Organics, Brandon, Manitoba R7A 7H2, Canada (Cymbaluk and Kyle); Dept. of Large Animal Clinical Sciences, D-201 Veterinary Medical Center, Michigan State University, East Lansing, MI 48824-1314 (Schott); and Dept. of Veterinary Clinical Sciences, 601 Vernon L. Tharp St., The Ohio State University, Columbus, OH 43210-1089 (Hinchcliff). © 1998 AAEP.

## 1. Introduction

Little data are available on physiological and behavioral effects of various equine husbandry practices. Recent research within the pregnant mare urine (PMU) industry comparing continuous and intermittent watering methods and comparing mares under daily, weekly, and biweekly (every 2 weeks) turnout schedules with those who were tie stalled indicated a similarly normal health and hydration status among widely varying conditions (see the companion paper on page 19). This paper reports on the behavior of those mares.

## 2. Materials and Methods

The studies were conducted on a PMU ranch from November through March during 1995-1998.

Mares were housed in a tie-stall barn at 5-10 °C and were 4-5 months pregnant at the start of each study.

### A. Watering Method

Eighty-one mares were randomly assigned to one of three variations of intermittent (flip lid opened for 5 min three times daily,  $n = 20$ ; timer-activated flow for ~2 min q 2 h from 0600 to 2400 h,  $n = 14$ ; timer-activated flow to float-controlled level, five times daily, 5 min each,  $n = 14$ ) or continuous watering systems ( $n = 33$ ). For each animal, one 24-h continuous videotaped sample of behavior was obtained.

### B. Turnout Schedule

Forty-eight mares were randomly assigned to daily ( $n = 16$ ), weekly ( $n = 16$ ), or biweekly ( $n = 16$ ) pad-

---

## NOTES

dock turnout (3 h with other mares, 1000 h to 1300 h). For each mare, a continuous videotaped sample including the 21 h before and 21 h after turnout was obtained once during November-December and again during February. Behavior was directly observed during the 3-h turnout period. A pedometer affixed to a foreleg estimated limb activity during each sample and during turnout.

### C. Behavior Measures

Frequencies, episode, and total durations of eating hay, standing rest, recumbent rest, drinking, aggressive social interaction, affiliative social interaction, self-grooming, and any stereotypy (weaving, cribbing, head movements, object chewing, or mouthing) or atypical or abnormal behaviors were recorded. For each sample, a quantitative behavioral time budget and a daily activity pattern were constructed. In addition, general temperament was subjectively assessed (calm, restless, active, anxious, aggressive, or socially interactive), and any unusual or abnormal behaviors were detailed. All results were also clinically evaluated by an experienced equine behavior clinician, who compared quantitative results to predefined norms for stabled horses.<sup>a</sup> All procedures were completed without knowledge of assigned conditions.

### 3. Results

#### A. Watering Method

All measures were similar among watering methods, with the exception that drinking frequency was significantly greater for continuously watered mares (14.02 min) than for those given intermittent watering (average 6.80 min; analysis of variance,  $p < 0.05$ ). All samples were clinically normal, with the exception that total drinking duration for continuously watered mares was greater than the normal range of 1-3 min for horses in box or tie stalls with water in buckets available continuously. No classic stereotypies or abnormal behaviors were observed.

#### B. Turnout Schedule

For all behavior measures, there were no significant differences that were due to the turnout schedule or to day-before versus day-after turnout. With the exception that the recumbent rest total duration was

significantly greater during the February (84.5 min) replicate than during the November-December (32.7 min; repeated measures analysis of variance,  $p < 0.05$ ) one, there were no differences that were due to the replicate. All behavior samples were judged to be clinically normal, with no classic stereotypies observed.

### 4. Discussion

Behavior was similarly normal with various watering methods, with the exception that the total drinking duration was greater for continuously watered mares. Since water volume consumed was not different from that of interval watering systems, this increased drinking duration was possibly due to the low water level (1-2 in., or ~2.5 - 5.0 cm) in this particular system.

Behavior was also similarly normal across widely different turnout schedules, with no differences between the day before and the day after weekly and biweekly turnout. This is consistent with recent reports that the behavior of stabled horses is not associated with the interval from last turnout or exercise.<sup>1</sup>

All sample mares were free of abnormal behavior. No classic stereotypies were observed. This is consistent with observations of low incidence of stereotypies and abnormal behaviors among tie-stalled horses in the PMU industry and elsewhere.<sup>b,c</sup> As a population, these mares exhibited behavioral time budgets and daily activity patterns that were remarkably similar to those of pregnant mares in box stalls or at pasture. The longer recumbent rest duration during February may be related to advancing pregnancy. In box-stalled and pastured pregnant mares, standing and recumbent rest increase as gestation advances.<sup>c</sup>

### References and Footnotes

1. Fulmer BK, Russell MA, Albright JL, et al. The effects of exercise and turn-out on the stalled behavior of horses. *Proc ENPS* 1997;15:328.

<sup>a</sup>McDonnell SM. Unpublished clinical norms. September 1996.

<sup>b</sup>Stookey J. Tufts New England Veterinary College, N. Grafton, MA 01536 (personal communication), 1996.

<sup>c</sup>McDonnell SM. Unpublished data. January 1995.