Duration of gestation in Thoroughbred mares kept under tropical and subtropical climate

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In horses, luminosity and nutrition are well characterized to control reproductive cyclicity and duration of gestation. However, limited information exists on the effects of temperature, precipitation, and humidity. Therefore, we hypothesized that temperature and humidity combined affect the duration of gestation in mares kept under tropical and subtropical climate. The objective of this study was to assess the effects of temperature and humidity on the duration of gestation of Thoroughbred mares. The gestational length of 376 Thoroughbred mares carrying and delivering normal singleton foals (n = 720) were recorded and analyzed for four foaling seasons of the Southern Hemisphere. Additional data recorded included foal gender, mare age (young 3-7 years vs. mature ≥8 years) and parity (primiparous vs. multiparous). The mares were housed in three stud farms as follows: stud farm 1, (removed to preserve confidentiality, subtropical), altitude 212 m (n=400 pregnancies of 203 mares); stud farm 2, (removed to preserve confidentiality, subtropical), altitude 875m (n=98 pregnancies of 49 mares); and stud farm 3, (removed to preserve confidentiality, tropical), altitude 626m (n=202 pregnancies of 124 mares). Stud farm 2 was located in an intermediate geographic region between stud farms 1 and 3. All mares were submitted under similar management and nutritional conditions, i.e., kept on pasture throughout the day, supplemented with grain and kept in a stall during the night upon imminent foaling. Climatological endpoints assessed included dry bulb temperature (Tdb), relative humidity (RH), precipitation, and the calculated temperature-humidity index (THI). The meteorological data were gathered from official national weather stations in the three different stud farms. All mares naturally covered, the ovulation was confirmed by daily per rectum palpation and ultrasonography examination. Continuous data were analyzed by ANOVA and post hoc comparisons with Tukey’s test. It was considered the interactions of the location and foal gender, parity and age of the mares. Significance was set at p<0.05 and results expressed as mean ± SD and ranges. As previously reported colts (343 ± 10, 320-390 d, n=361 foals) had longer gestation than fillies (340±12, 321-375 d, n=359 foals) (p=0.03), with no significant effects of location, or interactions with weather conditions. As anticipated mature mares (344 ± 11, 321-390, n=342 pregnancies) had longer gestation lengths than young mares (341±11, 320-375 d, n=378 pregnancies) (p=0.009). Stud farm 1, had the longest gestation length (344±12, 320-390d) followed by stud farms 2 (338 ± 7, 321-358 d), and 3 (337±7, 320-366 d) (p<0.001). The RH and precipitation were similar (p>0.05) for stud farms 1 (73 ± 7%; 140 ± 99 mm³, respectively) and 2 (80 ± 5 %, 140 ± 91 mm³, respectively), but significantly higher (p<0.001) than stud farm 3 (67 ± 3%; 40 ± 46 mm³, respectively) for both endpoints. The Tdb and THI were significantly different (p<0.001) for all three locations (Stud farms 1 (15.4 ± 2.9°C, 60 ± 4.5) 2 (17.3 ± 6 °C, 64.4 ± 9.6), 3 (20 ± 2, 66.3 °C ±3). There were no significant interactions (p>0.05) between location, foal gender, parity and age of the mare. Since mares were managed similarly, we suggest that the effects observed in gestation length are likely due to temperature and consequently THI, rather than location. Humidity and precipitation appeared to not have affected gestation length.

Keywords: Pregnancy, temperature, relative humidity, temperature-humidity index

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