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Maximum permissible load for Yonaguni ponies (Japanese landrace horses) trotting over a short, straight course

A Matsuura*, H Mano, M Irimajiri and K Hodate

Department of Animal Science, School of Veterinary Medicine, Kitasato University, 23-35-1, Higashi, Towada, Aomori, 034-8628, Japan
* Contact for correspondence and requests for reprints: matsuura@vmas.kitasato-u.ac.jp

Abstract

This study aimed to determine the load-bearing capacity of trotting Yonaguni ponies using gait analysis. The Yonaguni pony is one of the Japanese landrace horses, and has normal gait characteristics when trotting. As a breed they are small in stature and hence susceptible to the effect of the rider's weight. It is therefore important to determine their load-bearing capacity as regards to their welfare. Ten Yonaguni ponies with a (mean ± SD) height at withers of 122 (± 2.9) cm had a marker attached to their chests, and their unridden gait was recorded using two high-resolution hybrid cameras while they trotted along a short (40 m), straight course. In total, nine tests were performed for each horse: the first with a 0-kg load; seven with randomly loaded weights weighing 10–70 kg; and then a final test again with a 0-kg load. Three-dimensional movement of the marker was analysed using a motion capture system. The time series of vertical displacement of the marker underwent spectrum analysis, and the autocorrelation coefficient was calculated. The first two peaks of the autocorrelation were defined as symmetry and gait regularity, and their sum was defined as stability. Symmetry (no unit) in the 70-kg test (0.53) was lower than that in the first 0-kg test (0.68), and stability (no unit) in the 70-kg test (1.16) was lower than that in the first 0-kg test (1.41). We concluded that the maximum permissible load for a trotting Yonaguni pony is < 70 kg, which represents 33% of its bodyweight. To promote welfare, it is important to determine the load-bearing capacity for individual types of horse.

Keywords: *animal welfare, gait analysis, horse, load, symmetry, weight*