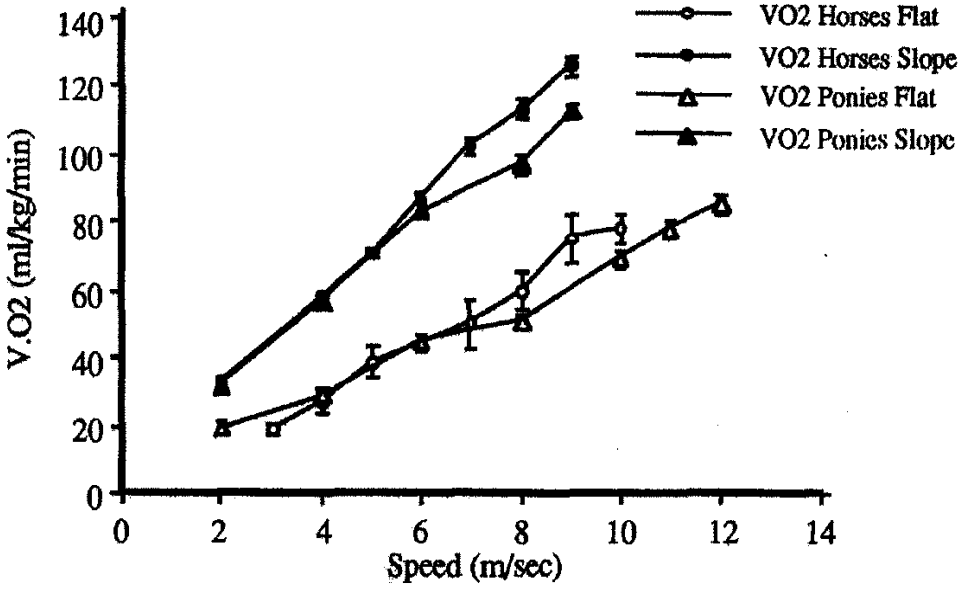
COMPARISON OF THE ENERGY COST OF TREADMILL EXERCISE IN HORSES AND PONIES

M.D. EATON, D.L. EVANS and R.J. ROSE

In the formulation of energy requirements for exercising horses, precise estimates of energy expenditure are necessary. While there have been some studies to determine energy expenditure during submaximal exercise (Pagan and Hintz 1986), the exercise intensities used ranged from 1-6 $m.s^{-1}$. This study was undertaken to test the hypothesis that energy expenditure as measured by oxygen uptake ($V.O_2$) during submaximal exercise is similar in Thoroughbred horses and ponies. Furthermore, we quantified the difference in energy cost between exercise on the flat and exercise on a gradient of +10%.

We examined nine ponies (weight 338±10 kg, mean±SEM) and seven thoroughbreds (493±8 kg), exercising on a treadmill where the inclination could be adjusted and the speed varied from 0 to 14 $m.s^{-1}$. After several acclimatising runs and familiarisation with gas collection mask, the horses and ponies were given incremental exercise tests at 0% slope and +10% slope. The speeds on the flat ranged from 3 to 12 $m.s^{-1}$ and on the slope varied from 2 to 9 $m.s^{-1}$. For expired respiratory gas collection, a lightweight loose fitting mask was used with an open flow system (Seeherman and Morris 1990). The system was calibrated for flow using a N_2 dilution technique and gas flow rates between 5000 and 7500 $l.min^{-1}$ were used to ensure complete expiratory gas collection and no restrictions to ventilation. The mean (±SEM) results are presented in the figure.



There were no significant differences in the energy cost of exercise in the Thoroughbred horses and the ponies. The economy of locomotion (oxygen cost per metre travelled) was similar ranging from 6.5 to 9.5 $ml.kg^{-1}.m^{-1}$ on the flat and 13.9 to 16.3 $ml.kg^{-1}.m^{-1}$ at a slope of +10%. We conclude that energy expenditure is similar over a range of submaximal speeds in Thoroughbred horses and ponies.

PAGAN, J.D. and HINTZ, H.F. (1986). J. Anim. Sci. 63: 822.
SEEHERMAN, H.J. and MORRIS, E.A. (1990). Equine Vet. J. Suppl. 9: 20.

Departments of Veterinary Clinical Sciences and Veterinary Physiology, University of Sydney NSW 2006