Patterns of dispersion, behaviour, and reproduction in feral horses (*Equus caballus*), and plant growth in Argo Valley, Waiouru.

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ABSTRACT.

Observations on feral horses (*Equus caballus*) in the Army Training Area at Waiouru from February 1993 to April 1994 showed that horses were not evenly distributed throughout their range and the highest density of horses was in the Argo ecological zone. After a muster in June 1993 which cleared horses out of the Argo Valley, horses returned to the valley suggesting that this area constituted preferred habitat for the horses. Home ranges of bands varied in size between 23.2 and 883.0 ha.

Horses associated in three types of social groupings. These included the single-male breeding group, the multi-male breeding group, and the bachelor band consisting entirely of males. Changes in membership occurred in bands. 95% of interactions between neighbouring bands were observed in summer. Band members groomed other members in 23% of observed interactions. 75% of interactions observed between mothers and their offspring were suckling bouts. 136 suckling bouts involved foals, and 8 involved yearlings. The average length of a bout was 49.0 seconds (sd=22.1). The average time elapsed between suckling bouts increased significantly as foals grew older ($F=28.64$, $P=0.000$). There was no significant difference between foals in the length of time any individual foal spent suckling. Mothers terminated 6.1% of observed suckling bouts. Scan sampling indicated a lull in grazing approximately 4 hours after sunrise. Grazing resumed at approximately 10 hours after sunrise.

Mating behaviour was observed in September and November. Post mortem data and blood oestrone level analysis for mustered mares indicated that between 72% and 81% of mares were pregnant. Foaling was observed between September and March. The foal-to-mare ratio was estimated to be 0.3 and 0.32 in two consecutive breeding seasons. Foal-to-mare ratios differed significantly between ecological zones. The yearling-to-mare ratio showed a 62% loss compared to the foal-to-mare ratio for the previous year.

59-60% of bands observed contained foals and no yearlings while 12-14% of bands contained yearlings and no foals, suggesting that not all mares are capable of producing a live foal every consecutive season. Some mares had both a foal and yearling present in their band suggesting an ability to breed successfully in consecutive seasons.

A search for dead horses revealed 63 skeletons. Of skeletons that could be aged using dental characteristics, most were aged between 2 and 9 years. More dead males were found than females. Using census figures from previous years, the death rate was calculated by dividing 63 known deaths by 11130 estimated horse-years, giving a death rate of 0.006.

Using exclosure cages, productivity in the Argo basin ranged between 2.98 and 1.54kgDM/ha/day in December 1993, February, April and July 1994. Introduced grasses dominated the sward. Using published biomass requirements for horses, I calculated the carrying capacity of the Argo valley. It ranged from 184 to 93 horses between October 1993 and July 1994. The number of horses observed in the Argo valley did not exceed these figures over this time interval.

Future management of the Kaimanawa feral horse population will trial immunocontraception on a reduced population. To arrest population growth, up to 80% of mares will be vaccinated with porcine zona pellucida (PZP) which prevents fertilization of the ovum.

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