

**The Behaviour of Feral Pigs in North-west New South  
Wales**

**and its Implications for the Epidemiology of**

**Foot and Mouth Disease**

**A thesis submitted for the degree of Doctor of Philosophy,**

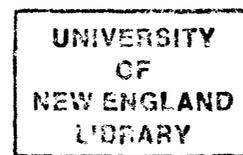
**of**

**the University of New England**

**by**

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## Summary

A population of feral pigs was monitored by radio-telemetry at at Nocoleche Nature Reserve, in the semi-arid rangelands of north-west New South Wales, Australia to see how high temperature and spatio-temporal variability in food supply influenced habitat utilisation, home-range size, hourly distance moved and adult body weight. Radio-telemetry data was collected during seven intensive tracking sessions between November 1991 and July 1993. This period covered a period of drought and subsequent good seasons following heavy rains in late 1992. Food supply was indexed by estimating pasture biomass in four distinct habitats. These habitats were shrubland, riverine woodland, woodland and ephemeral swamp. Shelter from high temperatures was indexed by the amount of cover estimated from Daubenmire Cover Scale estimates for each habitat. Riverine woodland had the most cover ephemeral swamps the least cover and shrubland and woodland intermediate cover. Habitat utilisation was significantly influenced by pasture biomass in the shrubland and high temperature. Use of shrubland increased with increasing pasture biomass in shrubland and decreasing temperature. Use of riverine woodland increased with decreasing pasture biomass in woodland and increasing temperature. Use of woodland increased with decreasing pasture biomass in shrubland. Use of ephemeral swamps increased with decreasing temperature. Habitat utilisation by feral pigs therefore responds to changes in pasture biomass in shrubland while also responding to temperature with habitats with more cover used more during hot weather.

Female home-range size increased with decreasing temperature and decreasing pasture biomass in shrubland and increasing pasture biomass in ephemeral swamps. Mean hourly distance moved increased with decreasing pasture biomass in shrubland. Adult body weight increased with decreasing temperature in the preceding month, and increasing pasture biomass in the woodland.

The influence of oestrous sows on the movements of free ranging feral boars was examined by comparing the distances between cages and feral boars before and after the addition of oestrous and non-oestrous sows. No significant change in distance was detected after the addition of the oestrous or non-oestrous sows.

To describe how an outbreak of foot and mouth disease (FMD) in feral pigs at Nocolche would behave an existing model of FMD in feral pigs was adapted to accommodate the variable population dynamics of pigs living in such an unpredictable environment through the numerical response of pigs to pasture biomass. This showed that unlike the deterministic disease model it was derived from the disease in this model always became extinct. Second, the variability in contact rate between individual pigs estimated from the radio telemetry data was incorporated, through the transmission coefficient  $\beta$ , into the model. This addition caused the disease to go extinct quicker than with the variable population dynamics alone. The disease model already modified by the addition of a stochastic demographic and stochastic disease parameter was further modified by a stochastic movement parameter (calculated from the radio telemetry data) to determine the minimum velocity of the diseases advance. The addition of this movement parameter made the diseases velocity of advance speed up and slow down.