



## ABSTRACT

The population ecology of the feral pig (Sus scrofa) was investigated in a topographically closed Hawaiian rain forest in Kipahulu Valley, Maui. This population, with a feral history of 35 years, probably erupted six generations after the onset of feralization. Emphasis was placed on investigating: (1) the factors which could limit abundance, and (2) population processes unique to this habitat. A natural history approach was used to examine the hypothesis that food quality, rather than quantity, could be limiting the population. Additionally, because of specific information needs of the National Park Service, particularly with regard to control programs, this study also sought to obtain management-related information as a basis for management recommendations.

Food habits were characterized by: (1) an omnivorous diet, consisting mostly of plant matter, (2) a staple of tree ferns, (3) a seasonal switch from tree ferns to strawberry guava, and (4) a strong reliance on earthworms as a source of animal protein. The dietary range covered 40 plant species; 62.5% were herbaceous species, 32.5% trees and a woody vine. Seventy percent of the forage were native plants of which 85.7% were endemics. Tree ferns were the most concentrated source of sugar and starch. Plant foods were low in protein, but feeding habits of the pigs resulted in maximization of foods rich in nitrogen. Blood profiles showed adequate nitrogen intake and protein status. Pig feeding habits resulted in the death of some native trees and damage to the ecosystem.

Feral pigs actively disperse the strawberry guava by transporting large quantities of seeds in their digestive tracts. Gut transport did not affect seed viability but hastened germination.

Home ranges averaged 1.6 (0.7-2.9) km<sup>2</sup>, and overlapped extensively. Lateral exit movement from the upper plateau into Koukouai gulch was established. The diel activity pattern was biphasic, with high activity in early morning and late afternoon.

High juvenile mortality and a shorter ecological longevity characterize this population. The median age was 16.2 months; male:female:juvenile ratio was 2.6:2.8:1. Breeding occurs throughout the year. Prenatal survival was less than 73.3%, while postnatal survival from birth to six months was 40%. The factors which could limit abundance were categorized into those that act on: (1) juveniles, (2) adults in their second year, and (3) older animals. Accidental mortality, miring of the young, habitat factors and mongoose predation were identified as the sources of juvenile mortality. *Metastrongylid* and kidney worm infection were considered important direct and indirect causes of adult mortality. Failure of dentition appears to be the most likely process limiting the lifespan of individuals.

Chemical blood analyses revealed neutrophilic leukocytosis in the population. The pathologic condition was a probable consequence to some disease factor, microbial milieu in the habitat or to nematode parasitism.

A 17-month mark-recapture program in the upper-plateau koa, ohia and lower plateau forests yielded a population estimate of 100-300 pigs, a catch success of 1.8 pigs per 100 trap nights. Density and trappability varied among forest types. Visitation frequency to trap sites averaged 17.5% of total trap nights.

Management is recommended principally because the feral pig disrupts and destroys native forests and replaces the native ecosystem with the exotic strawberry guava, which it effectively disperses. The management recommendations proposed herein incorporate a built-in eradication strategy to free the Valley of pigs and emphasize an integration of various control methods to maximally impact both young and old animals.