POPULATION BIOLOGY AND MANAGEMENT OF THE FERAL PIG
(SUS SCROFA L.) IN KIPAHLU VALLEY, MAUI

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

IN ZOOLOGY

DECEMBER 1982

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ACKNOWLEDGEMENTS

This study was supported by the United States National Parks Service under Contract CX 8000 8 0011, through the Cooperative Parks Resources Studies Unit, Department of Botany, University of Hawaii at Manoa. I gratefully acknowledge the funding. Haleakala National Park gave me permission to conduct this study in Kipahulu Valley. I thank the Park Superintendent, Hugo Huntzinger, and his chief rangers, Gordon Joyce, Kenneth Cox and Kimo Cababat, for their support and cooperation. Several park personnel assisted in field logistics and other aspects of the field work. I wish to especially mention John Kjargaard, Terrence Lind, Louis Pua, John Brown Jr., Alexander Smith Jr. and Alvin Yoshinaga. The goodwill and kindness that I received so generously from the people of the Hana Community are pleasant and memorable experiences which I will always cherish.

Several institutions and individuals gave me their kind cooperation. I thank Hana Medical Center for use of its centrifuge; Dr. Milton Howell for the use of his facilities; Maui Community College in Kahului, for extensive use of its science laboratories and welding workshop facilities; Department of Geography, Manoa, for use of laboratory facilities; Fronk Clinic and St. Francis Hospital, Honolulu, for use of radiographic facilities; Dr. Everitt Wingert for map reproductions; Roger Watanabe of the Soil Testing Service, Cooperative Extension Service, University of Hawaii and U.S.D.A. Cooperative, Manoa, for analyzing soil samples; and Stanley Ishizaki, Animal Science Department, Manoa, for performing proximate analysis of plant specimens.
The following individuals painstakingly identified vertebrate and invertebrate specimens I sent to them: Dr. P. Quentin Tomich, State Department of Health, Hawaii; Dr. Gordon Gates, Orange City, Florida; E. Easton, British Museum (Natural History), London, United Kingdom; Dr. Yoshio Kondo, Bishop Museum, Honolulu; and Alvin Yoshinaga, University of Hawaii at Manoa. The State Department of Agriculture assisted in the identification of parasites and in screening serum samples for diseases.

My fieldwork received renewed emphasis and momentum from Dr. Reginald Barrett's field visit in March 1979. I thank him for his interest in my work and his many useful suggestions. Encouragement by Dr. Clifford Smith throughout the period of my fieldwork is most gratefully acknowledged. He counselled and rescued me on several occasions when public relation issues seemed either too sensitive or insurmountable for me to handle.

Dr. John Stimson served as my Dissertation Chairman. I thank him for advice on various aspects of my writing. Others who have provided suggestions on the organization of this dissertation include Dr. Reginald H. Barrett and Dr. P. Quentin Tomich. The entire dissertation was read by Dr. Tomich, who provided many helpful suggestions. The following critically commented on these chapters: Dr. C. S. Chung (Chapter 11); Drs. N. A. Polombok, A. Y. Miyahara, R. M. Nakamura and S. A. Perri (Chapter 10); Dr. C. H. Lamoureux (Chapter 2); and Terrence Lind, Jack Lind and Kimo Cababat (Chapter 4). The table on Nomenclature, synonyms, common names and distribution of wild pigs
(Table 1) was critically reviewed by Dr. C. P. Groves at the Australian National University.

My wife, by some misfortune, has become associated with this study, and in performing functions as diverse as stomach content analysis, pick-up of specimens at the airport and delivery to various departments for analyses, data analyses and deciphering my drafts for a typeprint—duties quite alien to her professional training but which she almost always obliged. Finally, I wish to acknowledge Peggy Daniel, June Saito and the Cooperative Parks Resource Studies Unit for assistance in producing this final draft on the HP3000 Text and Document Processor.
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 95.7% 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$^2$, 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. Metastrongyloid 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.
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