

CHAPTER 4

FERAL HISTORY

Domestic animals that invade a habitat and establish breeding populations may be characterized in three ways: the length of time since escape from domestication, rate of invasion, and the genetic constitution of the founder population. Since introduced feral mammals often undergo eruptive fluctuations (Riney 1964), a knowledge of the length of time a population has been in an area would facilitate evaluation of population and vegetation characteristics. Typically, invasion of new habitats is by dispersal of subadult and adult animals (Singer 1981). The rate of invasion is measured as the rate of increase of a linear dimension of the range (Caughley 1977). The size, age, sex and genetic composition of the founder population is usually not well documented, hence reliance on observations by competent naturalists and long-time residents has to be made. The interview approach was adopted in an attempt to trace the history of the population in the Valley. Interviews were conducted with long-time residents, pig and goat hunters from Kaupo, Kipahulu, Hana, Nahiku and members of the Maui Sporting Club, Makawao, Maui.

Pig invasion into Kipahulu Valley is a recent event and occurred first from Haleakala Crater and later from coastal Kipahulu (Figure 11). The Crater was apparently pig-free before the nineteenth century. In 1841, naturalists Pickering, Drayton and Brackenridge of the United States Exploring Expedition (Wilkes 1845), together with 13 local

Figure 11: Pig invasion into Kipahulu Valley, Haleakala National Park, Maui, Hawaii. Note that the Valley was invaded from two geographic fronts and at two different times. Diagram also shows the location of the Valley in relation to the surrounding areas.



residents and missionaries, explored Haleakala Crater. No pigs were observed; the only mammals reported were two ungulates, goats and cattle, and a canid, the dog. In the early 1900s, goat hunting on Haleakala became an important sport. Until the 1930s no pig was ever observed by any regular Haleakala District goat hunter. In 1936, pigs were first sighted at Paliku (Freitas 1979 Makawao, Maui--taped interview) which is within the present Park boundary. Animals invading Haleakala District had white, black, red, and mixed coat colors, and were of domestic-type conformations. Polynesian-type pigs (Santos 1974 Kahului, Maui--taped interview) were not ("never seen one of those") encountered.

Pigs that were first seen in Haleakala District were believed to be derived from runaway domestic breeds in the Keanae and Piinau areas. Dispersal of feral populations from these areas into Haleakala District was believed to have proceeded from the north via Ainahou in the Koolau Gap. Hunting with dogs was singled out as an effective but dispersive method of harvesting pigs, and was claimed by one interviewee to be the factor that accelerated pig movements from lower areas into Haleakala District. Dog hunting in Haleakala District was however discontinued in 1961; the last two persons to dog-hunt on Haleakala were Frank Freitas and Anson Akoi.

Downhill movements of pigs from Haleakala Crater into the upper reaches of the Valley probably began as early as 1935. By 1945, signs of pig activity were observed in the head of the Valley down to 1370m (Fagerlund 1945, Hjort 1945). The Valley from 1370 to 610m was,

however, pig-free and described by the two expedition members, Fagerlund and Hjort, as "virgin forest." In the same year, Jack Lind, a Kipahulu resident, penetrated the Valley's lower plateau from below and hiked up to "the bend" (ca. 730m) to check unconfirmed reports of feral cattle (Lind 1979 Kipahulu, Maui—taped interview). Lind, who saw no cattle or pigs, nor signs of these animals, described the rain forest as "virgin land." Hence the Valley below 1370m was essentially pig-free in 1945, and hill invasion by pigs from coastal Kipahulu was thus a post-1945 event.

Coastal Kipahulu, during the early 1900s, was an important agricultural and population center in Hana District. Here pigs were raised under confinement. Several breeder farms were in operation; those belonging to Hiram Apo, David Kaalakeau, Paul Kaiwi Sr., Jack Lind, Kopai Starkay and Louis Smith, each housed 20-30 sows. Whereas breeder sows were confined, their litters were not; they were allowed to run freely and were raised in open pasture, under what was then known as free-farming (Lind 1979—taped interview). Free-farming appears to be the only system by which early Hawaiians and Polynesians could maintain a steady supply of animal protein. When confinement methods for raising pigs became mandatory on some Pacific islands for health reasons, pork production declined or stopped altogether (Luomala 1962). Natives were unable or unwilling to raise enough crops to feed the pigs. Free-farming of pigs in coastal Kipahulu, practiced with the underlying principle of maximum pork at minimum cost and encouraged by the then Department of Agriculture (Hollingsworth 1853), was in addition to

confinement rearing, a widely-practiced mode of pig husbandry in Kipahulu and Kaupo. Litters born in open pasture and raised by the sow herself were known to associate to a lesser extent with the general domestic herd. States of existence in pigs raised by free-farming including those that have escaped were essentially of domestic-pariah and pariah forms, as borne out by such descriptions: "they sometimes come back to feed," and "we know where they are," (emphases are mine). Upslope invasion of the Valley by domestic breeds from coastal Kipahulu thus began with free-farming practices, which led to the formation of pariah populations and feralization of pigs via the pariah population model.

A food resource which might have been of importance in encouraging pariah states of existence and holding initial feral population to lower elevations was the strawberry guava, Psidium cattleianum. This exotic plant was already established in Kipahulu pastureland and lower Kipahulu Valley prior to the uphill feralization of pigs into the Valley. By 1950, true feral populations were found on Palikea and adjacent areas. In the early 1960s, some 10 years after their feralization, pigs were described as being very abundant on Palikea, Puu Ahuula, and from the coast in upper pastureland and lower Kipahulu Valley. Pig hunting for table meat and trophies became important and popular at this time when breeder farms were no longer in operation. Hunting dogs were raised and special breeds were kept. At least 200 pigs were harvested annually by two Kipahulu families from Kipahulu pastureland and the lower Valley. Upslope hunting with dogs was believed to have accelerated pig movements

up the Valley, initially at least. Pigs had probably invaded the entire Valley well before 1967, but it was in that year that the occupation of the entire Valley by pigs was first documented by scientists (Warner 1967).

Thus the Valley was invaded along two geographic fronts, at two different times and with two sources of animals which appeared genetically similar, i.e. European domestic breeds. The present Valley population has been in existence for about 30-35 years.

The minimum rate of invasion was 0.45km per year, assuming complete occupation of the Valley by pigs in 1967 and that the invasion front at 1370m was reached by pigs from coastal Kipahulu. A more realistic rate of spread would be 0.76km per year. Rates of invasion may be atypical because of the bounded palis, which by restricting lateral dispersal could have inadvertently increased dispersal in the upslope direction. Caution must be observed when rates of spread are to be compared between studies. That published for feral pigs in forest-scrubland-grassland-mountainous terrain on Auckland Island, New Zealand is 0.67km per year (Challies 1975). The wild boar in the mountainous deciduous forest in Great Smoky Mountains National Park was found to spread at a rate of 2.75km per year. Although cited references are not very explicit, it is most likely that the maximum rates of invasion are given. The rate of spread for the pigs in the highly dissected Valley and the relatively short period of time the animal took to occupy the area shows its ability to disperse over rough terrain and

that the gait and travel patterns in this quadruped are adapted for movements in difficult terrain.