

## An Osteological Study of the Mandible of Feral Pig in Savai'i Island (Western Samoa)

By

**Hideki ENDO**

Department of Zoology, National Science Museum,  
3-23-1 Hyakunin-cho, Shinjuku-ku, Tokyo, 169 Japan

**Daishiro YAMAGIWA**

**Yoshihiro HAYASHI**

Department of Veterinary Anatomy, Faculty of Agriculture,  
The University of Tokyo, Bunkyo-ku, Tokyo, 113 Japan

**Takao NISHIDA**

Laboratory of Anatomy and Physiology, Nihon University,  
Fujisawa, Kanagawa, 252 Japan

and

**Eisaku KANAZAWA**

Department of Anatomy, Nihon University School of  
Dentistry at Matsudo, Matsudo, Chiba, 271 Japan

**Abstract** We examined osteometrically two mandibles of feral pig from Savai'i Island of Western Samoa. Sex and age were determined by observation of molars. These two male mandibles of similar age are obviously different in shape and proportion. It suggests that various breeds of domesticated pig have been introduced to Savai'i Island and established in the forest. The present data are useful to clarify the history of feral pig in the South Pacific region including Western Samoa.

### Introduction

Many domesticated pigs have been introduced by mariners, traders and farmers to oceanic islands of the South Pacific, where the large mammals have not been naturally distributed. Its naturalization was facilitated by hunters that used the feral pigs in the game (THOMSON, 1922; MCILROY & KING, 1995), and in some islands, the pig population has been established as feral animals. The distribution, habitat, food and morphological character of introduced pigs have been examined in some islands (CLARKE & DZIECIOLOWSKI, 1991; MCILROY &

KING, 1995). In the feral pigs of Western Samoa, the morphological record has not been published. Therefore mandibles obtained from Savai'i Island (Western Samoa) were examined in the osteological characters.

### Materials and Methods

Two mandibular specimens of feral pig (*Sus scrofa*) were brought from Savai'i Island of Western Samoa to Japan and donated to the National Science Museum, Tokyo (Specimen No.: NSMT-M30001 and M30002) by Nihon University International Research Program. We described the shape character comparing two mandibles. The mandibles were evaluated by 25 measurements according to the ordinary methods (DUERST, 1926; DRIESCH, 1976; ABE, 1989). Measurements were carried out with a vernier caliper to 0.5 mm.

The age was determined from the data of eruption and attrition pattern of lower teeth (HAYASHI *et al.*, 1977; ENDO *et al.*, 1994). Annual layers in cement or dentin were not observed in the histological level as a criterion here. Sex was determined by the value of canine measurements using the former method (HAYASHI *et al.*, 1977; ENDO *et al.*, 1994).

### Results

The dorsal aspect of specimens NSMT-M30001 and -M30002 are shown in Figures 1 and 2. The value of 25 measurements are given in Table 1. We considered that M30001 belongs to Age group V, while M30002 to Age group IV from the molar eruption and attrition. The sex was regarded as male in both mandibles from the value of Höhe des Eckzahns.

The two mandibles were obviously different in shape. M30001 was shorter in length and robust in mandibular body where the lateral surface protruded (Fig. 1). The area of symphysis was much larger in M30002 than in M30001. The eruption of incisors was abnormal in arrangement in M30001. Left and right P<sub>1</sub> was not recognized in both specimens. The lateral view of mandibles were shown in Figures 3 and 4. The ramus of mandible was massive and well-developed in rostral-caudal direction in M30001 (Fig. 3), as the ratio of Breite des aufsteigenden Astes to Unterkieferlänge vom Winkel aus indicates. The condylar process was highly developed in M30002, so the mandibular notch was deeper in lateral view than in M30001 (Figs. 3, 4). The body of mandible was not developed in height in M30002 (Fig. 4), as the ratio of Unterkieferhöhe hinter dem M<sub>3</sub> to Unterkieferlänge vom Winkel aus suggests.

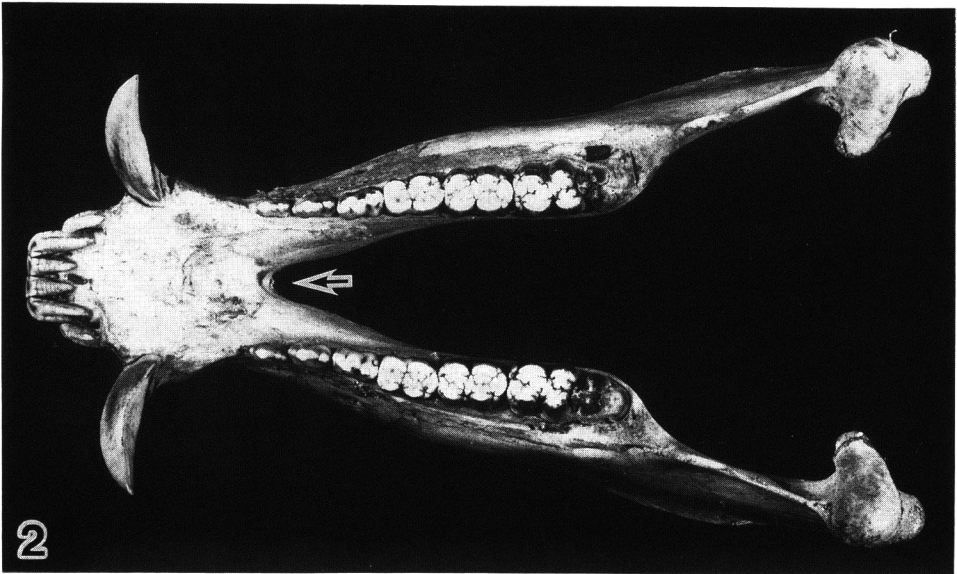
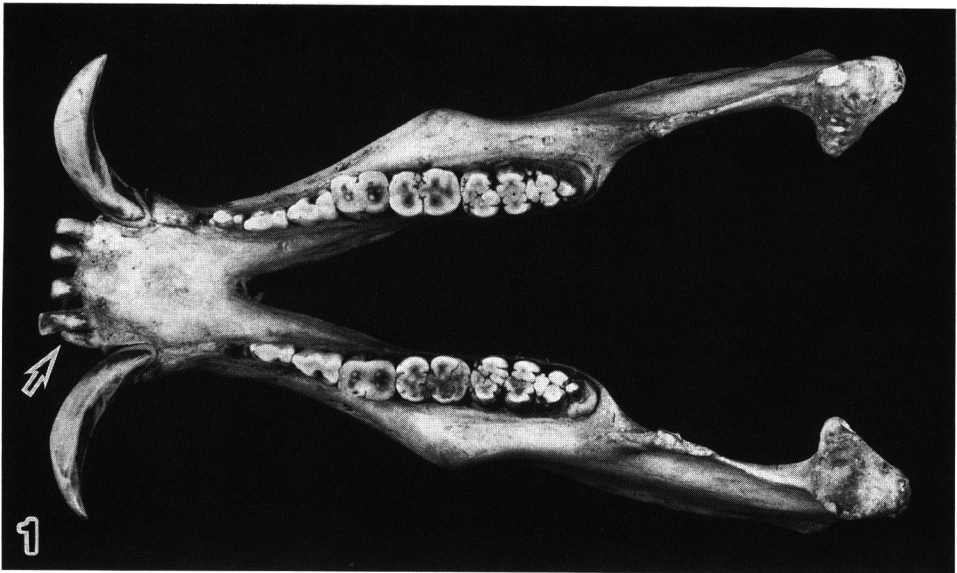


Fig. 1. The dorsal aspect of specimen NSMT-M30001. The eruption and arrangement of incisors are abnormal (arrow).

Fig. 2. The dorsal aspect of specimen NSMT-M30002. The area of symphysis is much larger than in M30001 (arrow).

Table 1. The value of measurements of specimens (mm).

Measurements	M30001	M30002
Unterkieferlänge vom Winkel aus	201.0	221.5
Unterkieferlänge vom Gelenkfortsatz aus	210.5	228.0
Caudale Asthöhe	105.5	111.5
Orale Asthöhe	101.5	106.0
Mittlere Asthöhe	93.5	95.5
Unterkieferhöhe hinter dem M <sub>3</sub>	52.5	48.5
Höhe des Unterkiefers in der Mitte von M <sub>1</sub>	36.0	38.0
Länge der Symphyse	42.5	59.0
Breite des aufsteigenden Astes	64.5	65.0
Condilocoronoidlänge	37.0	33.0
Länge des horizontalen Astes	139.5	159.5
Länge der Backenzahnreihe	97.5	101.5
Länge der Prämolarrreihe	32.0	35.0
Länge der Molarreihe	62.5	65.5
Längsdurchmesser der Caninalveole	20.5	16.5
Länge des Diastemas zwischen Eckzahn und Schneidezähnen	1.0	7.0
Länge der Incisivreihe	/	38.0
Breite der Pars incisiva mandibulae	49.5	57.5
Breite zwischen den Unterkieferwinkeln	123.5	127.0
Breite zwischen den Gelenkfortsätzen	100.0	107.5
Breite zwischen den Kronfortsätzen	74.0	/
Transversale Breite der Gelenkrollen	23.5	29.5
Dicke der Gelenkrollen	25.0	27.0
Breite des Unterkiefers auf der Höhe des M <sub>1</sub>	59.5	61.0
Breite je einer mandibel auf der Höhe des M <sub>1</sub>	28.0	24.0
Höhe des Eckzahns	50.0	39.0

## Discussions

The morphological examination on the external morphology in some feral pig populations of New Zealand indicated that the feral pig varies in size, shape and colors (MCILROY & KING, 1995). They concluded that the populations had been derived from various domesticated breeds. However, osteometrical data have not been obtained from the feral pig of the South Pacific islands including New Zealand. Hence the study of the origin and history of feral pigs depended on cultural anthropology (CLARKE & DZIECIOLOWSKI, 1991).

In the feral pig of Savai'i Island, the historical study in the establishment of feral pig has not been undertaken. In the present study, two mandibles were obviously different in shape and size. It is suggested that various breeds of domesticated pig have been introduced and crossed mutually and that various lines were established within the island. The present data are not enough to mention the original breeds and the naturalization process in the feral pig. In the

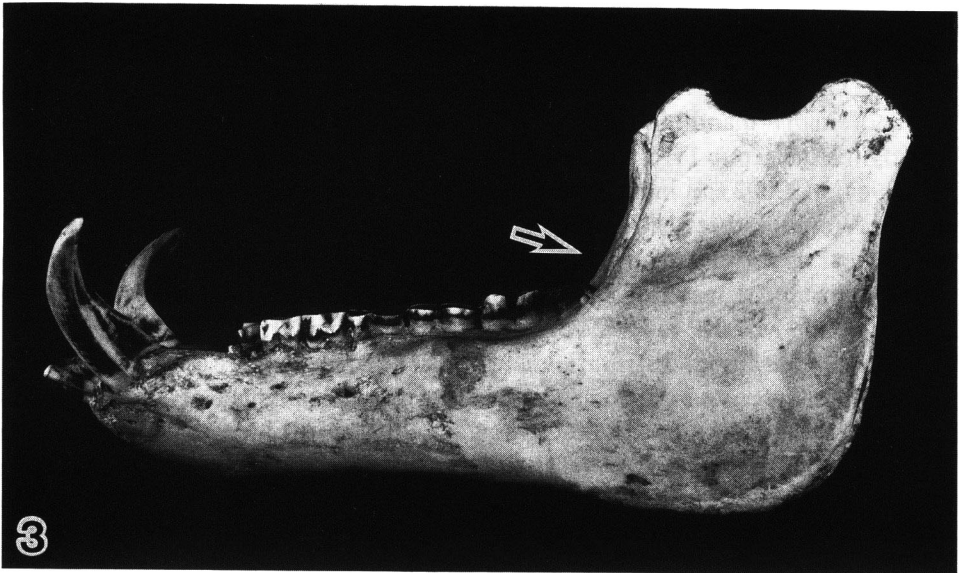


Fig. 3. The lateral view of mandible NSMT-M30001. The ramus of mandible is massive and well-developed in rostral-caudal direction (arrow).

Fig. 4. The lateral view of mandible NSMT-M30002. The condylar process is highly developed (arrow), so the mandibular notch is deep.

future, after the sample size become larger, the history of feral pig will be clarified in this island.

The age group of two specimens was different. However, because the growth curve of many mandible traits and external measurements reaches a plateau already in Age group IV of Japanese and Ryukyu wild pigs (ABE, 1989; ENDO *et al.*, 1994), M30002 specimen is suggested to be normal and typical to adult animal in size. We think that absolute age of the specimens is difficult to determine from histological data, since the island is located in a region without obvious seasonal change. From the result of age grouping, M30001 is estimated to be older than 4 years, while M30002 is 3–4 years in the absolute age (HAYASHI *et al.*, 1977).

The habitat, food, distribution and density of feral pig are unclear in Savai'i Island. In many cases in oceanic islands the ecological influence of artiodactyls on fauna is serious (CLARKE & DZIECIOLOWSKI, 1991; MCILROY & KING, 1995), so the population dynamics of feral pigs should be examined for the wildlife management program.

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