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Short communication

Numerical variation of teeth in the wild house musk shrew *Suncus murinus* captured from Nagasaki, Japan

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ABSTRACT

Wild populations of *Suncus murinus* from Nagasaki were thought to be extinct, although specimens from Nagasaki are kept at the National Science Museum, Tokyo. Variation in the number of teeth, including both congenital and postnatal absence, was observed in 25 of 85 individuals. All 25 abnormal individuals were checked using a micro-CT unit to document the presence or absence of embedded teeth and any traits of postnatal absence. Four of these had congenitally absent teeth, whereas the rest showed signs of postnatal absence. There was no significant difference in the ratio of length of tooth group P^4M^3 against palatal length between individuals with congenital absent teeth and normal ones. Because *S. murinus* in captivity shows a high rate of periodontal disease, we suggest that the high rate of postnatal absence of teeth in the wild population is due to oral diseases such as periodontal disease or other traumatic factors.

1. Introduction

The house musk shrew *Suncus murinus* belongs to the Insectivora (Soricidae) and has many morphologically primitive characteristics, including tribosphenic mandibular molars.[1] This species ranges widely across the Middle East, the Indian subcontinent, and Southeast Asia, from tropical to subtropical regions; the most northern record is from Nagasaki Prefecture, Japan (Fig. 1).[2] Populations of *S. murinus* show extreme morphological variations. For example, body weight vary three- to four-fold amongst wild populations. The mean male weigh in Bangladesh reaches nearly 150 g, whereas in Guam, males weight less than 50 g.[3,4] The dental formula of the species is generally described as I3/1, C1/1, P2/1, M3/3 = 30,[1] although some authors have questioned this formula.[5,6] Although soricid dentition tends to be stable,[7] variation in tooth number, especially missing teeth, has been reported in *S. murinus*.[1,8,9] A laboratory strain that originated from a wild population in Nagasaki (NAG) shows an extremely high rate of missing I^3 (97.7%).[10] We assume that this high frequency of missing I^3 was inherited from the single male and female from which this strain originated.[11]

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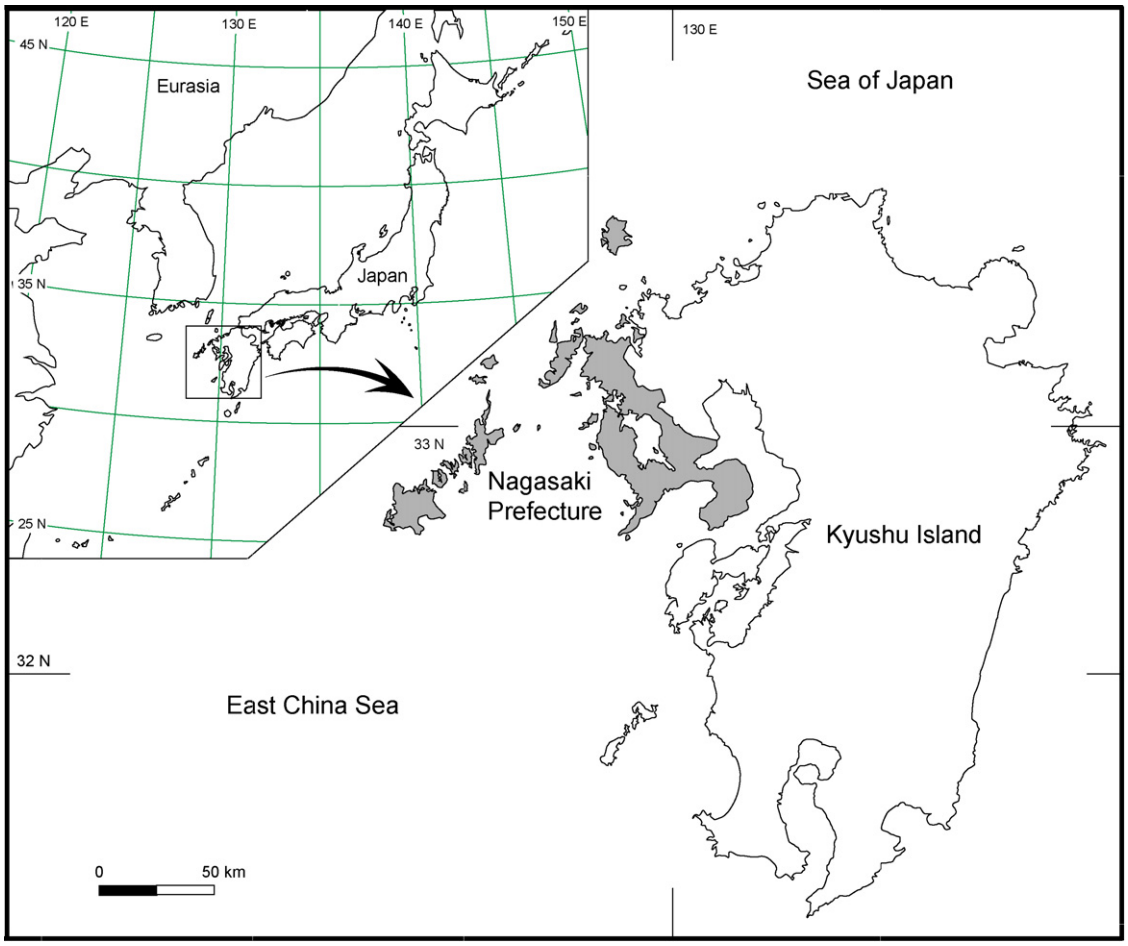

Fig. 1 – Location of Nagasaki Prefecture (in gray) in the Japanese archipelago.

It seems reasonable to assume that the 'founder effect', that is, the inheritance of traits in the progeny, may have resulted in the congenital absence of I^3 in this genetically restricted strain.[10] Although wild populations of *S. murinus* in Nagasaki are extinct,[12] we discovered many museum specimens of wild *S. murinus* that were collected in Nagasaki by Shin-ichi Morita in the 1950s and 1960s,[13] and are currently housed at the National Science Museum, Tokyo (NMST). We therefore investigated the rate of oligodontia of wild Nagasaki *S. murinus* using these collections. In addition, Natori and Shigehara suggested that congenital tooth loss depends on the ratio of the molar series length to palatal length.[8] Therefore, we investigated the cause of the missing tooth using the methods of Nagori and Shigehara.[8]

2. Materials and methods

In total, 85 specimens of wild *S. murinus* collected in Nagasaki Prefecture were investigated. The specimens were housed at the NSMT and registered as M33877–M33899, M33907–M33963, M33401, and M33403–M33406. We assessed the variation in dentition using both macro- and microscopy. Missing teeth without any surface structure or other evidence of a tooth ever having been present were considered to indicate tooth loss, whereas those without crowns but with sockets or roots were not considered indicative of tooth loss. Moreover, in some specimens, postnatal tooth loss was covered by regenerated surface bone. Therefore, all specimens with tooth loss were analysed using X-ray technology (Shimadzu Co., SMZ-225CT-SV3; μ-CT unit) by checking for the presence of roots or traces of alveoli. The two-dimensional images from the μ-CT unit were used to create three-dimensional (3D) images using a 3D reconstruction computer program (Ratoc System Engineering

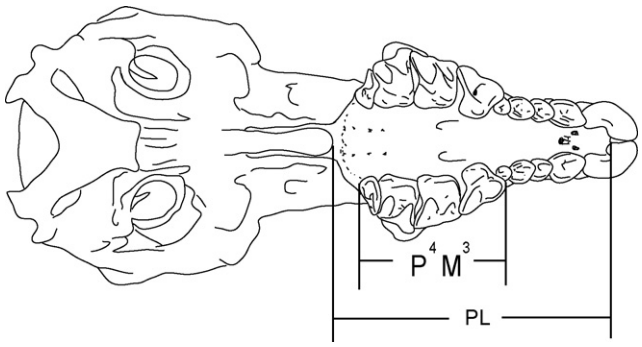

Fig. 2 – Skull measurements. PL: palatal length; P^4M^3: distance from maxillary fourth premolar to third molar.