

Tooth morphologies of *Pusa* and *Phoca* seals and its relation to their diet

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Tooth shape is often related to its diets in many animals. The relationships between tooth morphology and diets are well studied for Antarctic seals but are poorly known for seals that inhabit in the northern hemisphere. In this study, we address this gap by examining the tooth morphology of *Phoca* and *Pusa spp.*, which have different feeding ecology. We hypothesized that tooth jaggedness would be higher in the species that consume greater amount of zooplankton than those who consume exclusively on fish. To examine this hypothesis, maxilla and mandible were photographed using museum skull samples. In three species of genus *Pusa*, tooth bluntness increased while tooth jaggedness decreased with age. Of the three species of genus *Pusa*, two species showed an increase in tooth gap with age, while the rest depicted no significant relationship between tooth gap and its age. As such, a trend of decreasing jaggedness with age was observed in the three *Pusa* species, but regardless of age, the jaggedness of baikal seal (*Pusa sibirica*) was higher than that of the other two species. Zooplankton consumer, genus *Pusa* had relatively high tooth jaggedness, whereas genus *Phoca*, fish consumers, had relatively small tooth gap size. Despite this propensity, baikal seal showed explicitly higher jaggedness than other *Pusa* group, and had slightly greater tooth gap as *Phoca* group had. Overall, our result highlights a unique tooth morphology of baikal seal compared to its relative species.

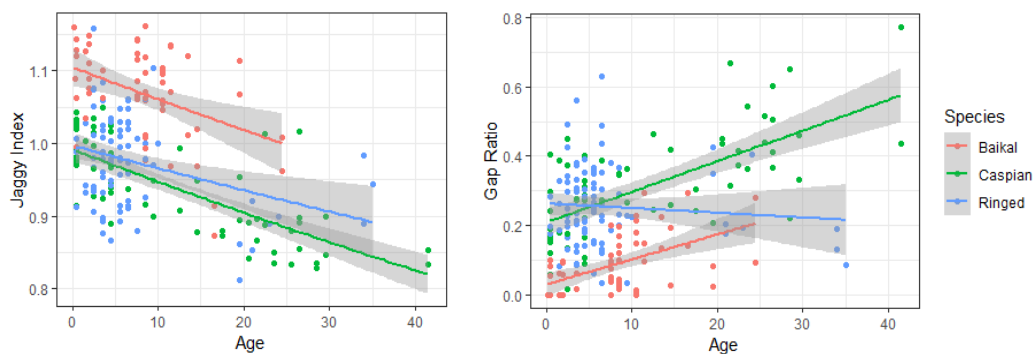


Figure1. (a) Jaggy Index: measurement of tooth jaggedness, plotted against age estimation data. (b) Gap ratio: proportion of tooth gap to its teeth width, plotted against age estimation data. Lines for each data were drawn by generalized linear model using package ggplot2 of R. Grey bands represent 95% credible intervals.

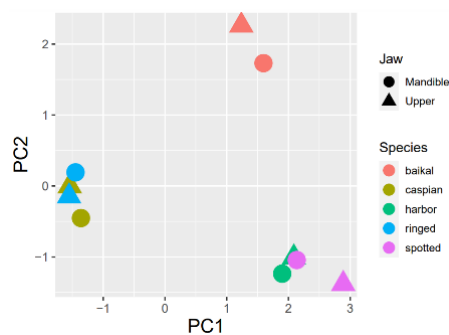


Figure2. Principal component analysis based on tooth morphologies of *Pusa* and *Phoca* species. Variables used for PCA were: Jaggy Index, Gap Ratio, Cusp bluntness: using Area of the teeth 2 mm from the cusp tip measurement directly, Tip bluntness: computed by calculating radius of the cusp tip from circumference of the cusp tip, and tooth height.