

Seasonal testicular changes and assessment of sexual maturity in feral male raccoons (*Procyon lotor*) in Hokkaido

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The raccoon (*Procyon lotor*) is a mammal indigenous to North America. In Hokkaido, feral raccoons have been increasing since 1979 and are currently under nuisance control. One reason for this increase is thought to be their high reproductive potential, but little is known about their reproductive physiology. The aim of this study was to clarify seasonal changes in the testes and the timing of sexual maturation in feral male raccoons in Hokkaido.

We investigated external characteristics, histology of the testes, and plasma testosterone concentration in two captive raccoons (0-year-old and 5-year-old males) from December 2008 to September 2009, and in 210 feral male raccoons captured from May 2008 to September 2009. The captive 0-year-old male became able to produce spermatozoa in April 2009. The captive 5-year-old male produced spermatozoa actively from autumn to spring. From May to October in almost all feral 1-year-old males, the weight of the testes and the diameter of the seminiferous tubules increased rapidly, and the penis became extrusible. In October, spermatozoa could be

observed. Some feral males produced spermatozoa before they were 1 year old. Spermatogenesis in feral males over 2 years old was active from September or October. Spermatozoa were observed in the cauda epididymis throughout the year, but the amount of spermatozoa decreased in the summer.

In the present study, it was clarified that many male raccoons entered puberty (differentiation of spermatogonia) at 1 year old in the spring, and started to produce spermatozoa during the following winter mating season; however, some males with good nutrition can produce spermatozoa earlier. Moreover, after they reach sexual maturity, they show seasonal changes in the testes; although spermatozoa are observed in the cauda epididymis throughout the year, spermatogenesis does not occur actively during the summer season of June to September. In order to further understand the reasons for the increasing numbers and distribution, studies of social and behavioral characteristics of reproduction are necessary.