

Study of transmission pattern in sarcoptic mange
of raccoon dogs (*Nyctereutes procyonoides*) in Japan

Abstract of Doctoral Thesis

Natsuko Sugiura

Graduate School of Veterinary Medicine and Life Science

Nippon Veterinary and Life Science University

Sarcoptic mange is a parasitic skin disease caused by the mite *Sarcoptes scabiei*. In Japan, sarcoptic mange outbreaks have been observed in wild raccoon dogs (*Nyctereutes procyonoides*). Previous studies have suggested the cross-transmission of *S. scabiei* between raccoon dogs and other animals, and it is necessary to confirm the transmission pattern of *S. scabiei* in raccoon dogs. The objective of this study was to confirm factors of the epidemic of sarcoptic mange in raccoon dogs and the transmission pattern of *S. scabiei* considering the ecology of raccoon dogs.

In a camera-trapping survey, a sarcoptic mange epizootic occurred after raccoon dog population densities increased. It is suggested that direct contact among raccoon dogs increase with high population densities. Based on genetic analysis of pregnant females and fetuses, there was a possibility of multiple paternities in wild raccoon dogs, which suggests that direct contact of multiple raccoon dogs in the mating season may have occurred. When raccoon dog population densities increase in the mating season, the frequency of transmission of *S. scabiei* may encourage sarcoptic mange spread.

Previous studies were conducted with the suspicion that a factor of the sarcoptic mange epizootic in raccoon dogs was direct contact transmission between parents and offspring. However, in these results, many infested individuals were unrelated. Additionally, the transmission pattern between breeding pairs is not an important factor for the sarcoptic mange epizootic. Based on genetic structure analysis of raccoon dogs in Gunma Prefecture, wherein genetic groups were distributed and gathered, it was suggested that raccoon dogs had sedentary habits. Considering that the sarcoptic mange epizootic occurred locally, it is suggested that direct contact between closely inhabiting individuals, without blood relationship, is an important factor of the local sarcoptic mange epizootic.

Based on genetic structure analysis of *S. scabiei* in Gunma Prefecture, the distribution of the genetic population structure of *S. scabiei* is not linked to the genetic population of raccoon dogs and mixed population in the same host animals. Additionally, two genetic groups were mixed between raccoon dogs and red foxes, suggesting that

cross-transmission of *S. scabiei* among these animals may have occurred. Based on genetic structure analysis of raccoon dogs and *S. scabiei* in Kanagawa Prefecture, the distribution of the genetic population structure of *S. scabiei* is also not linked to the genetic population of raccoon dogs. Thus, it is possible that *S. scabiei* transmission is complex, including raccoon dogs and many other animals. There is a high possibility that many host animals are related to the transmission of *S. scabiei* in raccoon dogs.