

資料

Mixed infestation of Sarcoptic mange and *Demodex* sp. on an Asian black bear (*Ursus thibetanus*) in Gunma Prefecture

ANEZAKI Tomoko<sup>1</sup>, SAKANIWA Hiroyuki<sup>2</sup>, NAKAYAMA Hiroyuki<sup>2</sup>,  
ABE Yukiko<sup>3</sup>, TAKIZAWA Katsuyuki<sup>3</sup> and HIGUCHI Akihiro<sup>3</sup>

<sup>1</sup>Gunma Museum of Natural History, 1674-1 Kamikuroiwa, Tomioka, Gunma Prefecture  
370-2345, Japan, anezaki@gmnh.pref.gunma.jp

<sup>2</sup>Natural Environmental Division, Department of Forestry and Environmental Affairs,  
Gunma Prefecture Government, 1-1-1 Ohtemachi, Maebashi City, Gunma Prefecture, Japan.

<sup>3</sup>Gunma Livestock Health Laboratory, 2425-3 Kogure, Fujimi Village, Seta-Gun,  
Gunma Prefecture 371-0103, Japan.

**Abstract:** Parasitological and histopathological examinations were performed on a four-year old male Asian black bear (*Ursus thibetanus*) with clinical signs of mange which was culled in Numata City, Gunma Prefecture. As a result, GMNH-VM-1150 was found to be infested with *Sarcoptes scabiei* and *Demodex* sp. The mixed infestation of *S. scabiei* and *Demodex* sp. mites on an Asian black bear is the first case to be reported in Gunma Prefecture.

**Key Words:** Sarcoptic mange, *Sarcoptes scabiei*, *Demodex* sp., Asian black bear, *Ursus thibetanus*

## Introduction

A mange has been reported in raccoon dogs (*Nyctereutes procyonoides*), palm civets (*Paguma larvata*), and wild pigs (*Sus scrofa*) in Gunma Prefecture (Yamamoto et al., 1998; Sakaniwa et al., 2009; Anezaki et al., 2010), but not in Asian black bears. Parasitological and histopathological examinations were performed on a four years old male Asian black bear (*Ursus thibetanus*) with clinical signs of mange which was culled in Numata City, Gunma Prefecture. Clinical signs of skin include hair loss, crusting and focal erosions. In the present paper we report the morphological study on the causative agent of the mange condition.

## Material and Method

An Asian black bear collected from Numata City, Gunma Prefecture (GMNH-VM-1150, VM09-411) was studied for parasitological and histopathological examinations. The GMNH-VM-1150 was reported raiding apple field and was culled on February 15, 2010. The head and body length was 111cm, and weighed 43kg.

The extensive hair loss and thick lichenified skin were observed over approximately 70 % of the body (Fig.1). The body surface of GMNH-VM-1150 was examined for any presence of acarine ectoparasites. The skin scrapings were performed from areas with clinical signs of mange. The skin specimens were (1) placed in 10% potassium hydroxide (KOH) solution for 2 to 6

hours at room temperature, and (2) fixed in 10% buffered formalin. Each specimen was examined microscopically.

The age of GMNH-VM-1150 was determined by cement layers of canine, third premolar and fourth premolar using the protocol of Kleinenberg and Klevezal (1966), and Willey (1974).

## Result and Discussion

GMNH-VM-1150 was 4 years old based on examination of the cementum annuli in a premolar tooth (Kleinenberg and Klevezal, 1966; Willey, 1974).

The clinical signs of lesions were observed in left shoulder, left ear, left hand and arm, and left thigh. Hair loss was also observed in these lesions (Fig 1-1, 1-2). The hair was matted and speckled with fine white flakes. The level of infection is about 70%, classified as Class III based on Pence and Ueckermann (2002).

The scrapings of the skin were observed under the optical microscope, and scanned by electron microscope. As a result, GMNH-VM-1150 was infested with *Sarcoptes scabiei* and *Demodex* sp. (Fig.2). The Asian black bear infested with *S. scabiei* has been reported by Shibata (2004), but mixed infection with *Demodex* sp. is the first case to be reported in the Gunma Prefecture. *Sarcoptes scabiei* has characteristic of turtle like shape, transverse parallel ridges and numerous spines on the dorsal surface (Baker et al., 1956; Morrison et al., 1982; Morner, 1992; Burgess, 1994). It is one heterogenous species with various isolates as variants (Zahler et al., 1999; Bornstein

et al., 2001). *Demodex* are tiny, wormlike, annulate, eight-short-legged mites (Baker et al., 1956). *Demodex ursi* is known as a host specialist only occurs on black bears and not so common in the wild according to Foster et al. (1998). It has been reported in National Forest in Florida (USA) (Forrester et al., 1993; Desch, 1995; Foster et al., 1998). It is common in domesticates such as dog, cattle, sheep, goat and cat, and its transformation from one host to another takes place through contact in infancy (Irwin, 1937; Baker et al., 1956). In dogs, infestation of mites is thought to be initiated by an immunisuppressive disorder and/or hereditary defect in the immune system (Lemarie, 1996; Scott et al., 1995; Foster et al., 1998). The origin of these mites is not

known, but this bear may have been infestated by the mites in its infancy and harbored these mites for several years. More study is needed on host-parasite relationship in the black bear population in Gunma Prefecture.

A severe infestation with mange mites has been recognized in wild mammals in Gunma Prefecture since 1980's. Unfortunately, a degree of spread of mange within the prefecture is still not known. A system of collecting information of mange observed in the wild animals is necessary in carrying out the wildlife management.



Figure 1-1 Clinical signs of lesions were observed in left shoulder, left ear, left hand and arm, and left thigh of GMNH-VM-1150



Figure 1-2 Extensive hair loss and thick lichenified skin observed on left hand of GMNH-VM-1150

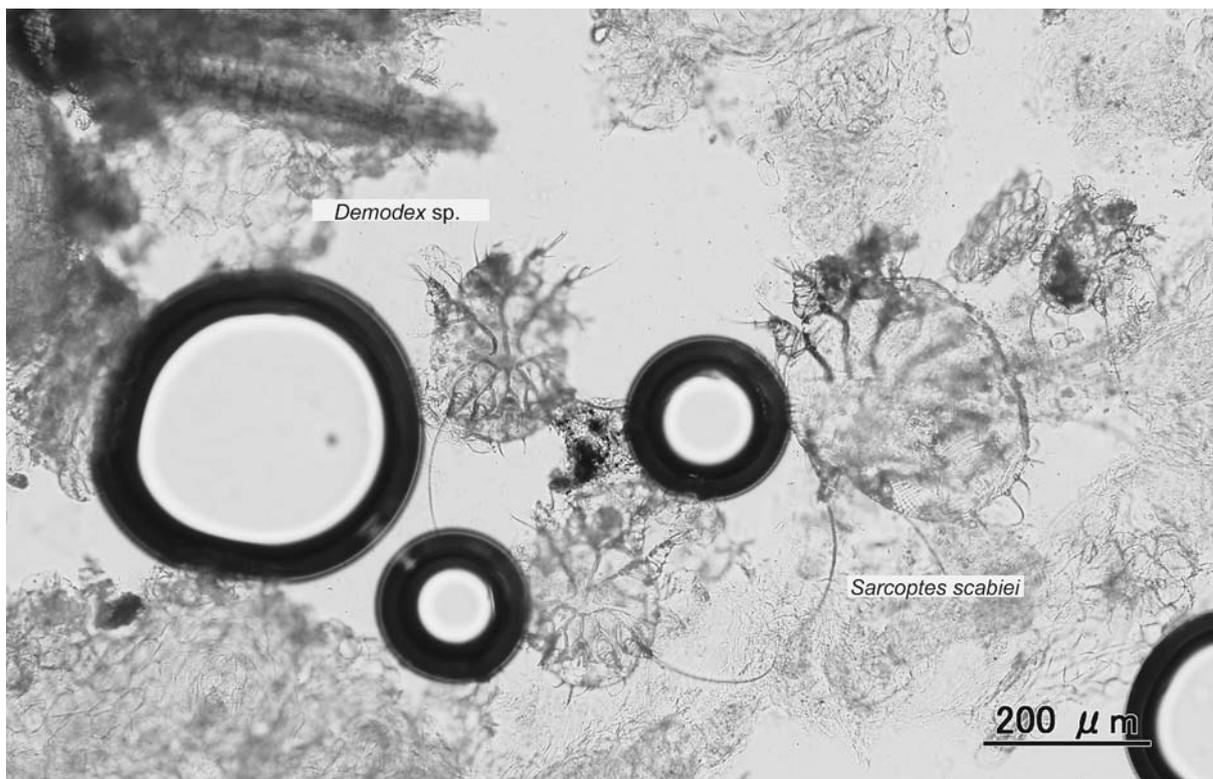


Figure 2. *Demodex* sp. and *Sarcoptes scabiei* found on GMNH-VM-1150 (by Gunma Livestock Health Laboratory)

## Acknowledgement

We deeply thank the municipal government and hunting association of Kawaba Village, Numata City, Gunma Prefecture for their cooperation.

## References

- Anezaki, T., Sakaniwa, H., Tanaka, Y. and Kurokawa, N. (2010) : Sarcoptic mange of palm civet, *Paguma larvata*. Bulletin of Gunma Museum of Natural History, (14) : 141–144.
- Baker, E.W., Evans, T.M., Gould, D.J., Hull, W.B. and Keegan, H.L. (1956) : A manual of parasitic mites of medical or economic importance. National Pest Control Association Inc., New York, 170pp.
- Bornstein, S., Morner, T. and Samuel, W.M. (2001) : *Sarcoptes scabiei* and sarcoptic mange. In Samuel, W.M., Pybus, M.J. and Kocan, A.A. (eds.) Parasitic Diseases of Wild Mammals. Wiley-Blackwell 2nd edition, Ames, 107-119.
- Burgess, I. (1994) : *Sarcoptes scabiei* and Scabies. Advances in Parasitology **33**:235-293.
- Desch, C.E. Jr. (1995) : A new species of *Demodex* (Acari: Demodecidae) from the black bear of North America, *Ursus americanus* Pallas, 1780 (Ursidae). International Journal of Acarology, **21**:23-26.
- Fitzgerald, S.D. (2008) : Sarcoptic mange and *Pelodera dermatitis* in an American black bear (*Ursus americanus*). Journal of Zoo and Wildlife Medicine **39** (2) :257-259.
- Forrester, D.J., Spalding, M.G. and Wooding, J.B. (1993) : Demodicosis in black bears (*Ursus americanus*) from Florida. Journal of Wildlife Diseases, **29**:136-138.
- Foster, G.W., Cames, T.A. and Forrester, D.J. (1998) : Geographical distribution of *Demodex ursi* in black bears from Florida. Journal of Wildlife Diseases **34** (1) :161-164.
- Irwin, I. (1937) : Demodetic mange of dogs. Veterinary Medicine, **32**:318-319.
- Kleinenberg, S.E. and Klevezal, G.A. (1966) : Age determination in mammals by the structure of tooth cement. Zoologicheskii Zhur, **45** (5) :717-724.
- Lemarie, S.L. (1996) : Canine demodicosis. Compendium on continuing education for practicing veterinarians, **18**:354-368.
- Morner, T. (1992) : Sarcoptic mange in Swedish wildlife. Rev. sci. tech. Off. int. Epiz., **11** (4) :1115-1121.
- Morrison, E.E., Robinson, S. and Gier, H.T. (1982) : *Sarcoptes scabiei* infestation of the coyote (*Canis latrans*), illustrated by the scanning electron microscope. Journal of Wildlife Diseases, **18** (2) :249-251.
- Pence, D.B. and Ueckermann, E. (2002) : Sarcoptic mange in wildlife. Rev. sci. tech. Off. int. Epiz., **21** (2) :385-398.
- Sakaniwa, H., Anezaki, T., Tanaka, Y., Kurokawa, N. and Kanai, H. (2009) : Examination of road-killed raccoon dog (*Nyctereutes procyonoides*) found in Ueno Village, Gunma Prefecture. Bulletin of Gunma Museum of Natural History, (13) :135-137.
- Scott, D.W., Miller, W.H. and Griffin, C.E. (1995) : Muller and Kirk's Small Animal Deomatology, 5th edition, W.B. Saunders Company, Philadelphia, 1213pp.
- Shibata, A. (2004) : Studies on mange of wildlife in Japan. PhD. Thesis on Nippon Veterinary and Life Science University, Tokyo, 143pp.
- Willey, C.H. (1974) : Aging black bears from first premolar tooth sections. Journal of Wildlife Management, **38** (1) :97-100.
- Yamamoto, S., Takahashi, M. and Nogami, S. 1998. Scabies in wild raccoon dogs, *Nyctereutes procyonoides* at the Tomioka-Kanra district in Gunma Prefecture, Japan. Med. Entomol. Zool. (The Japan Society of Medical Entomology and Zoology), **49** (3) :217-222.
- Zahler, M., Essig, A., Gothe, R. and Rinder, H. (1999) : Molecular analyses suggest monospecificity of the genus *Sarcoptes* (Acari: Sarcoptidae). International Journal of Parasitology, **29**:759-766.

