Clinical Mange of the Black Bear (Ursus americanus) Caused by Sarcoptes scabiei (Acarina, Sarcoptidae)

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tion is observed in the spring following a winter of arrested development. Williams et al. (1983, op. cit.) did acknowledge that considerable variations in the incidence of either the type I or type II disease syndromes might occur based on the diversities of physiographic and climatic conditions, as well as cattle management strategies. It is quite possible that the epidemiological conditions in the habitat occupied by this deer in the piedmont region of Georgia were suitable for the development of ostertagiosis type II during April as in northern temperate climates. Alternatively, it is possible that inhibition of larvae did occur in March, but was interrupted after a few weeks due to some immunosuppressive factor such as concomitant disease or nutritional stress.

Because *O. ostertagi* is a pathogen in domestic livestock, Prestwood and Pursglove (1981, *In* Diseases and Parasites of White-tailed Deer, Davidson et al. (eds.), Tall Timbers Res. Sta. Pub. No. 7, Tallahassee, Florida, pp. 318–350) suggested that under unusual conditions it may be a pathogen for deer. *Ostertagia ostertagi* does not occur commonly in deer, and experimental evidence shows white-tailed deer to be a poor host for this parasite (McGhee, 1981, J. Parasitol. 67: 969–970). Thus, the discovery of ostertagiosis due to *O. ostertagi* in a free-ranging white-tailed deer is unusual and unexpected. Whether there were any synergistic effects of the rickettsial-type organism, bacteria, or ticks with *O. ostertagi* is unknown.

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Clinical Mange of the Black Bear (*Ursus americanus*) Caused by *Sarcoptes scabiei* (Acarina, Sarcoptidae)

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Sarcoptic mange has been reported in numerous species of wild mammals including: red fox (*Vulpes vulpes*) and coyote (*Canis latrans*) (Trainer and Hale, 1969, Bull. Wildl. Dis. Assoc. 5: 387–391); gray wolf (*Canis lupus*) (Todd et al., 1981, Proc. First Worldwide Furbearer Conf. 2: 706–729); gray fox (*Urocyon cinereoargenteus*) (Stone et al., 1982, N.Y. Fish Game J. 29: 102–103); fisher (*Martes pennanti*) (O'Meara et al., 1960, J. Wildl. Manage. 24: 339); porcupine (*Erethizon dorsatum*) (Payne and O'Meara, 1958, J. Wildl. Manage. 22: 321–322); and eastern fox squirrel (*Sciurus niger*) (Allen, 1942, Am. Midl. Nat. 27: 338–379). Surveys and reviews of black bear ectoparasites make no mention of *Sarcoptes scabiei* (Rogers and Rogers, 1976, Proc. 3rd Int. Conf. Bear

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FIGURE 1. Alopecia and dried exudate covered a large area of the body of this black bear. Note skin folds on abdomen, neck, and upper legs.

Res. Manage. pp. 411–430; Rogers, 1975, J. Wildl. Dis. 11: 189–192; Manville, 1978, J. Wildl. Dis. 14: 97–101; and Smith and Addison, 1982, Ontario Ministry of Natural Resources, Wildl. Res. Report No. 99: 57–64). The only mange mites reported for black bears have been *Ursicoptes americanus* (see Yunker et al., 1980, J. Wildl. Dis. 16: 347–356). To our knowledge, this is the first report of mange due to *Sarcoptes scabiei* in black bears.

During the spring of 1984, two young bears were seen several times at the same location in Oscoda County, Michigan (Latitude 44°51′N; Longitude 83°56′W) with hair loss and crusty skin. On 22 May 1984, one of the two bears was shot in order to determine the cause of these lesions. It was submitted to the Rose Lake Wildlife Disease Laboratory (RLWDL) for necropsy. The bear was a yearling female in emaciated condition. There was almost complete hair loss over 50% of its body. Affected areas on the head, shoulders, and ventral surface of the body were covered by a thick grayish crust. Skin scrapings revealed numerous mites in all stages of development. The mite was identified as *Sarcoptes* sp.

In June 1984, another yearling bear with hair loss was observed in the same area. The animal was shot and examined by the local wildlife biologist, but was not admitted to the RLWDL for necropsy. This animal showed extensive hair loss and crusty skin over much of its body.

A third bear with severe alopecia was observed during the early winter of 1984–1985 in the hectare adjacent to where the young bears were found. The animal was seen regularly moving from its den to a private landfill. Due to the severe hair loss and poor body condition, an attempt was made to trap it. On 7 March 1985, the bear was captured alive in a culvert trap and taken to the RLWDL. It was tran-

FIGURE 2. Close-up of thickened skin of a black bear showing dry keratinous crust and deep cracks. ×5.

quilized with Ketamine HCl (Vetalar®, Parke-Davis, Morris Plains, New Jersey 07950, USA), examined, and euthanized with T-61 (American Hoechst Corporation, Somerville, New Jersey 08876, USA). Alopecia, lichenification, epidermal exfoliation, and dried serum exudate were seen over the entire body except along the back and parts of the lower front legs (Fig. 1). The most severely affected areas were the abdomen, chest, shoulders, neck, muzzle, back of the head, and back of the ears. In these areas the skin was thickened and covered by a gray, dry, keratinous crust which formed irregular plaques with deep cracks (Fig. 2). In areas (such as the abdomen, neck, and upper legs) where loose skin would normally be present, the thickened crusted skin formed folds (Fig. 1). There was a musty odor to this animal, that is characteristic of mangy animals

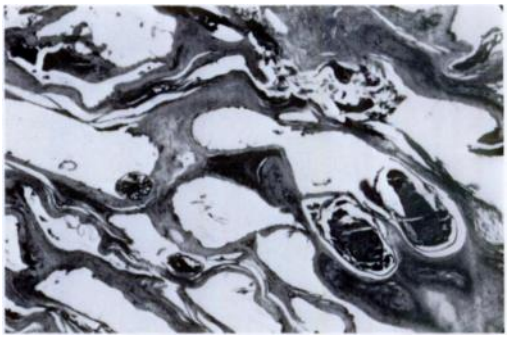

FIGURE 3. Section of skin from shoulder area of a black bear showing hyperkeratosis with tunnel formation and cross sections of mites and ova. H&E. ×28.

(Scott, 1979, Vet. Clin. North Am. [Large Ani. Pract.] 9: 79–92). There were no lesions indicating recent rubbings or scratchings or erythematous areas which would be expected with pruritus. Skin scrapings from any crusted area revealed large numbers of mite eggs, larvae, nymphs, and adults. Microscopically there was a marked hyperkeratosis with tunnel formation and many parasites and ova in the epidermis (Fig. 3). The mites were morphologically similar to *Sarcoptes scabiei*.

Samples of mites were preserved in 70% ethyl alcohol and sent to the National Veterinary Services Laboratory (NVSL) in Ames, Iowa for identification. The mites were identified as *Sarcoptes scabiei* using morphological characteristics. Specimens were deposited in the NVSL collection (Accession No. 85-35591-M85-83).

The age of the adult female bear was estimated at 8 yr by premolar cementum annuli count (Stoneberg and Jonkel, 1966, J. Wildl. Manage. 30: 411–414). She weighed 47.7 kg and had very little visceral or subcutaneous fat. The subcutaneous lymph nodes were enlarged and slightly congested. Light green-colored purulent material was found in the uterus and was draining from the vulva. There were two old placental scars found in the

horns of the uterus, indicating a previous pregnancy in which two cubs were born (Erickson et al., 1964, Mich. State Univ. Agr. Exp. Sta. Res. Bull. 4: 22–44).

It is possible that the two yearling bears with mange in the summer of 1984 were the offspring of the sow euthanized in 1985. All three bears were shot or captured within 1 km of one another. The yearling bears, which would have been born in January 1983, may have been represented by the two old, faded placental scars in the sow.

There were two plausible theories for sarcoptic mange in bears being rarely observed. One is that bears, which are normally solitary animals, have very little direct contact with other bears or with species such as red fox and coyotes that frequently have mange infestations. This theory assumes the possibility of interspecies transmission (Fain, 1978, Int. J. Dermatol. 17: 20–30) and may not be valid.

The second theory is that bears may have an innate or acquired resistance to infection by the mites. The sow and her presumed offspring may have had an immune deficient trait which made them more susceptible to sarcoptic mange. Sarcoptic mange with scaly, crusted, hyperkeratotic lesions such as these bears had, has been termed Norwegian scabies, which in man is generally found in immune depressed individuals (Calnan, 1950, Br. J. Dermatol. 62: 71–78; Fain, 1978, Int. J. Dermatol. 17: 20–30). A case of Norwegian scabies in a dog was postulated by Anderson (1981, J. Am. An. Hosp. Assoc. 17: 101–104) to be related to immune competence. No immunological testing was done to support the theory that immunosuppression was responsible for the sarcoptic mite infestation of these bears.

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Organochlorine Residues in Ducks on Playa Lakes of the Texas Panhandle and Eastern New Mexico

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The large numbers of ducks in winter at playa (naturally landlocked) lakes of the Texas Panhandle are dominated by mallards (*Anas platyrhynchos*), northern pintails (*A. acuta*), American wigeon (*A. americana*), and green-winged teal (*A. crecca*). The annual mortality of ducks that occurs at playa lakes in winter is generally attributed to disease (Jensen and Williams, 1964, *In* Waterfowl Tomorrow, Linduska (ed.), U.S. Fish and Wildlife Service, Washington, pp. 333–341; Bolen and Guthery, 1982, Trans. N. Am. Wildl. Nat. Resour. Conf. 47: 528–541) and is particularly heavy in Castro and Parmer counties in the southwestern corner of the Panhandle. Avian cholera has been epizootic in this area in winter since February 1944 when the first die-off from chol-

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