NOTOEDRIC MANGE IN GRAY SQUIRRELS (SCIURUS CAROLINENSIS) 1

Authors: CARLSON, BRENT L., ROHER, DANIEL P., and NIELSEN, SVEND W.

Source: Journal of Wildlife Diseases, 18(3) : 347-348

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-18.3.347

NOTOEDRIC MANGE IN GRAY SQUIRRELS *(SCIURUS CAROLINENSIS)*[1]

BRENT L. CARLSON, DANIEL P. ROHER, and SVEND W. NIELSEN, Northeastern Research Center for Wildlife Diseases, College of Agriculture and Natural Resources, University of Connecticut, Storrs, Connecticut 06268, USA.

Notoedres sp. was first reported as the cause of skin disease in the California gray squirrel *(Sciurus griseus griseus)* in El Dorado National Forest (Bryant, 1921, Calif. Fish Game 7: 128). The epizootic was so severe that it nearly exterminated the local population of squirrels (Bryant, 1926, Calif. Fish Game 11: 205-206). Small red spots with a scaly appearance and alopecia appeared first on the head and neck, and later on the body. The authors suggested that the formation of heavy scabs around the eyes may have interfered with normal food-seeking behavior causing severe emaciation (Bryant, op. cit.).

The mites taken from diseased squirrels were identified as *Notoedres minor* var. *cati* (Essig, 1926, Insects of Western North America p. 42). Lavoipierre (1964, J. Med. Entomol. 1: 5-17) however, redescribed the mite as *Notoedres douglasi* n. sp. which is more closely related to *N. muris* than to *N. cati*. *Notoedres douglasi* affects the California gray squirrel but may also occur on other species of the genus *Sciurus* or even related genera of Sciuridae (Lavoipierre, op. cit.).

This report describes gross and microscopic findings of seven gray squirrels *(Sciurus carolinensis)* with varying degrees of alopecia, and the relationship of these findings to cutaneous acariasis.

The squirrels were submitted by the Massachusetts Division of Fisheries and Game and the Massachusetts Audobon Society to the Northeastern Research Center for Wildlife Diseases for examination. They were captured in eastern Massachusetts in box-type live traps or found dead. Hair and skin scrapings were examined for parasites or fungi. Tissue samples were fixed in 10% phosphate buffered formalin, processed by routine methods, cut at 6 μm, and stained with hematoxylin and eosin for light microscopic examination. Representative specimens of mange mites have been deposited in the Rocky Mountain Laboratory, Hamilton, Montana, and assigned the accession number RML-115887.

Varying degrees of alopecia on the head, neck, and upper torso were evident on all seven squirrels. Three of the seven were mildly affected, with alopecia on 5 to 20% of the body surface and apparent regrowth of hair in previously alopecic areas. The other four had moderate to severe alopecia on 25 to 60% of the body surface and were emaciated and dehydrated. The skin in affected areas was thickened, wrinkled, and had a scurfy, leathery appearance. One squirrel had relatively thick, yellowish brown crusts on the left side of the face, extending caudally just behind the left forelimb, and on the dorsal area at the base of the tail.

Specimens of *Notoedres* sp. were recovered from scaly areas in four of seven squirrels. Skin scrapings from the hairless areas of the other three squirrels failed to demonstrate mites.

[1] Scientific Contribution No. 799, Storrs Agricultural Experiment Station, The University of Connecticut, Storrs, Connecticut 06268, USA.

Lesions in three animals consisted of a hyperkeratotic, acanthotic, and parakeratotic epidermis with microabscesses, several of which contained mites. The epidermis had prominent rete ridges and the superficial dermis was infiltrated by neutrophils and mononuclear inflammatory cells.

Mites were not observed in tissue sections of one squirrel from which mites were demonstrated in skin scrapings. The stratum corneum was hyperkerotic and revealed a fungus consisting of branching, septate hyphae, and spores in areas of epidermal desquamation as well as in the intact epidermis. The histopathologic features of the fungus were compatible with *Trichophyton mentagrophytes*, however, a definitive diagnosis of the fungus by cultivation was not made.

In one squirrel, the epidermis was thickened with focal parakeratosis and several microabscesses. Another squirrel had a thickened stratum corneum and predominantly mononuclear inflammatory cell infiltrate in the superficial dermis, and a third had hyperkeratosis without any inflammatory cell response.

The absence of mites in skin scrapings from three squirrels may have been related to scarcity of mites, longer postmortem interval, and/or method of preservation. The squirrels with apparent regrowth of fine secondary hair were probably recovering from a previous mite infection.

The lesions and their distribution in these gray squirrels are similar to those of the cat with notoedric mange. The skin of the head, neck, and shoulders become hairless, thickened, wrinkled, and covered by yellow crusts. Notoedric mange of the rat, on the other hand, is more typically restricted to the ear, nose, and tail, with the development of wartlike keratotic lesions.

Dermatitis produced by *Notoedres* sp. must be differentiated from dermatomycosis caused by *Mucor* sp. and *Trichophyton mentagrophytes* (gypseum) (Delamater, 1939, Mycologia 31: 519-536; Sauer, 1966, Am. J. Vet. Res. 27: 380-383). Diagnosis of dermatomycosis is made by observing fungi in skin scrapings directly or in the histologic sections. Cutaneous mucormycosis is characterized by acute dermatitis and frequent vascular thrombosis, due to invasion of fungus into blood vessels (Sauer, op. cit.). Lesions of *T. mentagrophytes* (gypseum) are typical of other tinea infections. They cover practically every part of the body. Microscopically the fungus is seen either in the hair shaft as chains of cuboidal arthrospores or outside the hair, as closely packed sheaths of small spores in the hair cuticle (Delamater, op. cit.).

Other forms of alopecia may be caused by endocrine disorders including hypothyroidism, hyperadrenocorticism, or ovarian and testicular dysfunctions, or by thallium toxicosis.

There does not appear to be any previously published information on the occurrence or distribution of *Notoedres* sp. in gray squirrels in the eastern United States. This parasite has existed possibly at a low level of prevalence without being recognized. Since transmission is by direct contact, the present cases may be related to the increased dispersal of gray squirrels reported in late Fall of 1978-79 following the mast crop failure earlier that year (McCord, pers. comm.). Nixon and McClain (1966, J. Wildl. Manage. 33: 353-357) reported a similar dispersal of gray squirrels in Ohio in 1966 following a mast crop failure. The mast crop failure occurred when squirrel populations were high and the apparent stress and scarcity of food may have produced conditions suitable for disease caused by *Notoedres*.

Received for publication 27 March 1980