

***Filaria taxideae* in Striped Skunks (*Mephitis mephitis*) of Colorado, USA, and Commonly Associated Filarial Dermatitis**

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ABSTRACT: During 2007–09, we necropsied striped skunks (*Mephitis mephitis*) from Colorado, USA. Eight of 51 (16%) had severe infections with the subcutaneous filarid nematode *Filaria taxideae*, and four of the infected skunks (50%) had dermatitis that was histologically associated with parasite ova in the skin.

Filaria taxideae is a filarid nematode that is a common subcutaneous parasite of badgers (*Taxidea taxus*) in Wyoming, USA (Keppner, 1969, 1971; O'Toole et al., 1993). In badgers, infections often are associated with dermatitis due to deposition of ova in the superficial dermis (Keppner, 1971) and at the dermal-epidermal junction (O'Toole et al., 1993). Adult filarids are present in the subcutaneous tissues, predominantly over the inguinal area and ventrum (Keppner, 1971; O'Toole et al., 1993), and they do not appear to incite a host response (Keppner, 1971; O'Toole et al., 1993). However, ova within the skin are associated histologically with hyperkeratosis, skin thickening, inflammation, hemorrhage, crusting, ulceration (Keppner, 1971; O'Toole et al., 1993), and vesiculo-bullous lesions (O'Toole et al., 1993). The life cycle of *F. taxideae* has not been fully described, but it is suspected that adult females living in the subcutis migrate to, and deposit ova within, the superficial dermis. These ova are expressed gradually to the skin surface, where they are consumed by blood-sucking dipterans that serve as an intermediate host (Keppner, 1971).

In skunks (*Mephitis* and *Conepatus*), there are limited reports of *Filaria* species. *F. taxideae* was identified in the subcutaneous tissues of three striped skunks (*Mephitis mephitis*) from Kansas (Worley, 1961) and several striped and hog-nosed skunks (*Conepatus leuconotus*) from Texas (Neiswenter et al., 2006). Earlier reports from Texas indicated *Filaria texensis* (a filarid nematode closely related to *F. taxideae* but thus far reported only in Texas) in the subcutaneous tissues of striped and hog-nosed skunks (Tiner, 1946; Chandler, 1947), including anecdotal reports from Texas trappers describing “skin worms” in skunks that were thought to “cause the hair to pull out in the infected areas of skin and thus ruin the pelts” (Chandler, 1947). Aside from this anecdotal mention of skin lesions likely associated with *F. texensis* infection, there is a single case report of filarial dermatitis associated with *F. taxideae* infection in a striped skunk from Kansas (Saito and Little, 1997), and one case report of *F. taxideae* and filarial dermatitis in a lesser panda (*Ailurus fulgens*; Gardiner et al., 1983). We report severe infections by *F. taxideae* in skunks from Colorado, USA, with half of the infected skunks suffering from filarial dermatitis.

During 2007–09, we necropsied 51 striped skunks submitted for rabies virus surveillance in Colorado. Grossly, eight of 51 carcasses (16%) had severe infections with subcutaneous nematodes. Based on morphologic characteristics as described by Keppner (1969), these nematodes were

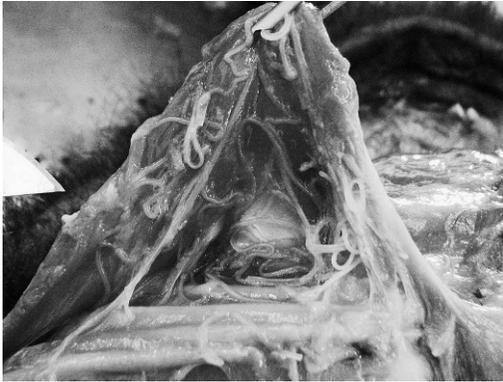


FIGURE 1. Subcutaneous adult filarid nematodes consistent with *Filaria taxideae* are present within the subcutis and muscle overlying the chest of a striped skunk (*Mephitis mephitis*) from Colorado, USA, 2009.

identified as *F. taxideae*. Prevalence is similar to that reported from Texas, with infection in two of 22 striped skunks (9%) and seven of 28 hog-nosed skunks (25%) (Neiswenter et al., 2006).

In skunks from Colorado, we noted large numbers of adults in the subcutis, affecting up to 50% of each torso. These parasites were predominantly over the dorsum, but some also were present on the dorsal aspect of the head and neck, along the chest wall and ventrum, and, in one case, the parasites were predominantly in the inguinal region. Adult parasites were coiled or extended within the subcutaneous tissue or underlying muscle layers in large clusters (Fig. 1). Occasionally, adults also were found in the abdominal or chest cavities. The presence of the adult parasites in these locations is consistent with previous reports from skunks (Saito and Little, 1997; Neiswenter et al., 2006) and a lesser panda (Gardiner et al., 1983). However, the distribution of adult parasites in skunks differs somewhat from that in badgers, in which adult *F. taxideae* occur more consistently along the ventrum and within the inguinal region (Keppner, 1971; O'Toole et al., 1993) and are not reported within body cavities.

In four of eight skunks with *F. taxideae*, we also noted regionally extensive alopecia,



FIGURE 2. Alopecia, skin thickening, and crusting on the dorsal aspect of the head and neck of a striped skunk (*Mephitis mephitis*) from Colorado, USA, infected with subcutaneous *Filaria taxideae*.

skin thickening, crusts, and rare ulceration (Fig. 2). Skin lesions were predominantly, but not exclusively, in regions where adult parasites also occurred in the subcutis, consistent with a previous report of filarial dermatitis in a skunk (Saito and Little, 1997). Histologically, skin lesions were centered on clusters of parasite ova within the superficial dermis, at the dermal-epidermal junction, within the epidermis, and at the skin surface. These findings are consistent with observations in badgers, for which it is suspected that gravid adult female *F. taxideae* deposit ova at or near the dermal-epidermal junction. Ova are likely expressed to the surface via a host reaction (Keppner, 1971), or are expelled via blisters and ulcers that form due to separation at the dermal-epidermal interface (O'Toole et al., 1993, 1994).

Histologic findings were similar to previous reports of skin lesions associated with *F. taxideae* in badgers (Keppner,

1971), a striped skunk (Saito and Little, 1997), and a lesser panda (Gardiner et al., 1983). Crusts were composed of degenerate neutrophils and parasite ova, occasionally admixed with bacteria. Ova were thick-shelled and contained a single larva. Crusts at the skin surface were associated with hemorrhage and necrosis of the epidermis. Adjacent to crusts, the epidermis was thickened and hyperkeratotic. Intradermal clusters of ova were associated with marked perivascular infiltrates of lymphocytes and plasma cells with fewer neutrophils, macrophages, and eosinophils.

We suspect the occurrence of *F. taxideae* and associated filarial dermatitis may be relatively common in skunks in Colorado and perhaps other areas, although reports are scarce. With this report, we seek to raise awareness of the parasite and its associated lesions in skunks. Filarial dermatitis should be considered as a differential diagnosis for skunks with skin lesions consisting of thickening and crusting on various parts of the body including the dorsum, head, neck, ventrum, and inguinal area. Gross lesions caused by *F. taxideae*, or possibly other species of *Filaria*, may easily be mistaken for mange, or attributed to infection with distemper virus. The systemic effects of *F. taxideae* infection are not known.

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