Clinical dermatitis in a southern brown bandicoot (*Isoodon obesulus*) associated with the mite *Sarcoptes scabiei*

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Abstract

A wild-caught adult male southern brown bandicoot (*Isoodon obesulus*) was presented for investigation of a pruritic skin condition that consisted of crusting, deep fissures, lichenification, alopecia, scale, and erythema, and affected the caudal dorsum, caudal, and medial thighs, distal hind limbs, tail, forepaws, and parts of the thorax. Examination of superficial and deep skin scrapings revealed large numbers of mites, which were identified as *Sarcoptes scabiei*. To the authors' knowledge, infestation with this mite has not previously been reported in bandicoots.

Keywords: Bandicoot, Dermatitis, Inflammation, Isoodon, Sarcoptes

Introduction

The southern brown bandicoot (*Isoodon obesulus*) is a small marsupial common in southern Australia that may be present in residual bushland in urban areas. A previous study of a population in the Perth metropolitan area found few clinically diseased animals (Wicks and Clark 2005a). Only two species

of mite, *Mesolaelaps antipodianus* and *Odontacarus* sp., have previously been reported from southern brown bandicoots in the Perth area (Domrow 1963; Thomas 1990). These mites were not associated with clinical skin disease. This case report describes clinical dermatitis in a wild-caught southern brown bandicoot that was infested with the mite *Sarcoptes scabiei*.

Case Report

A wild-caught, adult male southern brown bandicoot was presented by a wildlife carer for investigation of a skin condition. The animal originated on a two-acre bushland property in the southern suburbs of Perth and was captured by a member of the public who noticed the severe skin lesions. On presentation, the animal was in moderate body condition, weighed 1,510 g, and was active and responsive to handling. It was sedated with Zoletil50® (Virbac, Peakhurst, New South Wales), at a dose of 5 mg/kg, to facilitate examination. Over the dorsal sacral area, tail base, and flanks, the skin lesions consisted of alopecia and thick crusts with deep fissures (Fig. 1). Scale and erythema were present on the medial surface of the hind limbs, progressing to lichenification of the caudal thighs. Two smaller patches of scale, alopecia, erythema, and excoriation were present on the left side of the thorax, each around 1 × 2 cm. Additionally, a small patch of crusting was present at the external opening of each ear canal, although the ear canals themselves appeared clean. The paws of both fore limbs appeared erythematous. The inguinal region and scrotum did not appear to be affected. No other abnormalities were found on physical examination.

Superficial and deep skin scrapings of the affected areas were performed using a size 21 scalpel blade and paraffin oil and examined unstained by light microscopy. Several crusts were removed and fixed in a solution of 70% ethanol and 5% glycerol. Mites isolated from these were cleared and mounted in Hoyer's medium and identified using the keys from Domrow (1992). Blood was collected from the femoral vein using a 23-gauge needle and 3-ml syringe, and preserved in ethylenediaminetetraacetic acid (EDTA). A complete blood count was performed using an Advia 120 hematology analyzer and multispecies software (Bayer, Tarrytown, NY). Blood films were prepared and stained with Wright

and Giemsa stains. These were used to perform differential leukocyte counts ($n = 200$) and assess cellular morphology. Packed cell volume was measured by centrifuging blood in microhematocrit tubes for 5 min at 15,000 rpm (Biofuge haemo, Kendro Laboratory Products). Plasma total solids concentration was measured by refractometry, and fibrinogen concentration was determined by the heat precipitation method (Jain 1986).

Examination of skin scrapings revealed a high density of mites, including egg, larval, nymph, and adult life-cycle stages (Fig. 2). Examination of mounted and cleared adult specimens (Fig. 3) identified the mites as *S. scabiei*. The animal's blood exhibited a leukocytosis due to a mature neutrophilia and mild monocytosis and concurrent mild hyperfibrinogenaemia (Table 1). The neutrophils exhibited increased basophilia of the cytoplasm and occasional Döhle bodies (Fig. 4).

Discussion

To the authors' knowledge, sarcoptid mites have not been reported from bandicoots previously. However, *S. scabiei* infestation has been reported in several other species of Australian marsupial, including koalas (*Phascolarctos cinereus*), common ringtail possums (*Pseudocheirus peregrinus*), common wombats (*Vombatus ursinus*), southern hairy-nosed wombats (*Lasiorhinus latifrons*; Domrow 1992), and agile wallabies (*Macropus agilis*; McLelland and Youl 2005). Sarcoptic mange is considered to be an important infectious disease of wombats. Sequelae of infestation may include hemorrhage due to deep fissuring of the skin, pyoderma, and cutaneous myiasis (Skerratt et al. 1998). Ultimately, this may lead to the death of the animal and local decline of the population.

In the current case, the source of the mites is not known. As the animal originated from the wild, no history of exposure to a known source could be obtained, although contact with domestic animals could not be excluded. In agile wallabies, contact with domestic animals while in captivity was suggested as a source of infestation (McLelland and Youl 2005). Genetic analysis of mites from one

of the cases reported in this study (a free-ranging individual) found that the mites were genetically similar to *S. scabiei* var *canis* from the local domestic dog populations.

The concentration of leukocytes observed in this bandicoot indicates a systemic inflammatory response. The neutrophilia in the current case was similar in magnitude to the greatest values observed in a study of southern brown bandicoots with clinical evident inflammation, such as dog bite wounds (Wicks and Clark 2005b). In contrast to the current case, only one of eight animals exhibited morphologically atypical neutrophils. Consequently, the dermatitis incited by the *S. scabiei* infestation resulted in a significant systemic inflammatory response. Similarly, a mature neutrophilia and monocytosis has been reported in wombats experimentally infested with *S. scabiei* (Skerratt 2003).

The current case, the first report of *S. scabiei* infestation in a bandicoot, demonstrates that these animals may be clinically affected by infestation with these mites. However, the route of transmission and effects on the wild population are as yet unclear.

Acknowledgements

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Fig. 1 A southern brown bandicoot (*Isoodon obesulus*) showing severe crusting and alopecia of the dorsum and caudal thighs and tail and erythema of the forepaws due to infestation with *Sarcoptes scabiei*

Fig. 2 Light micrograph of a skin scraping from the same bandicoot showing high density of adult mites and several eggs (upper right corner)

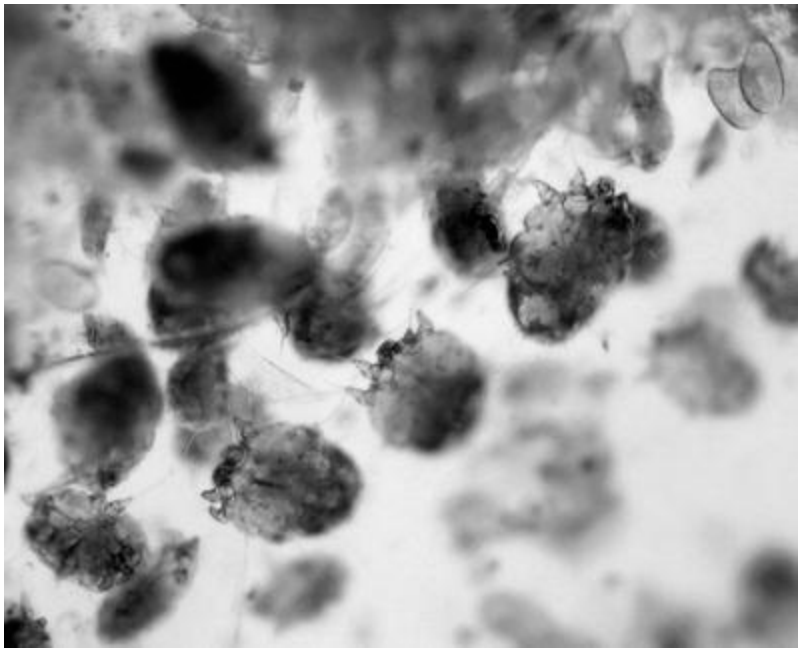

Fig. 3 Light micrograph of a mounted *Sarcoptes scabiei* specimen prepared from skin crusts from the bandicoot. **a** Dorsal view; **b** ventral view. *Bar* = 100 μm

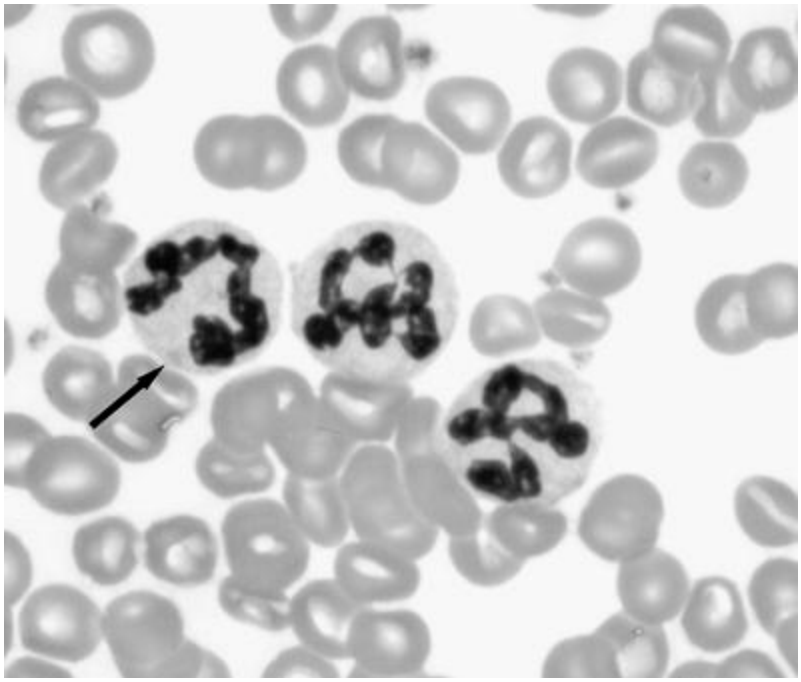

Table 1 Hematological values for a wild-caught southern brown bandicoot (*Isoodon obesulus*) with sarcoptic mange

Analyte	Values	Range
Leukocytes ($\times 10^9$/l)	12.7	1.25–7.68
Erythrocytes ($\times 10^{12}$/l)	7.55	5.42–8.40
Haemoglobin (g/l)	146	120–167
Haematocrit (l/l)	0.44	0.32–0.51
Packed cell volume (l/l)	0.42	0.29–0.50
Plasma total solids (g/l)	72	48–80
Fibrinogen (g/l)	7	1–6
MCV (fl)	57.6	57.1–65.8
MCH (pg)	19.3	19.1–23.4
MCHC (g/l)	335	318–364
Neutrophils ($\times 10^9$/l)	11.43	0.32–3.97
Lymphocytes ($\times 10^9$/l)	0.44	0.34–5.68
Monocytes ($\times 10^9$/l)	0.64	0.00–0.38
Eosinophils ($\times 10^9$/l)	0.19	0.00–0.91
Basophils ($\times 10^9$/l)	0	0.00–0.05