

Guidelines for treatment of Australian wildlife with sarcoptic mange

In brief

The mange mite *Sarcoptes scabiei* causes various forms of dermatitis and can lead to other medical conditions. Mange is known to affect bandicoots, dingoes, koalas, possums, potoroos and wallabies, and can be fatal in bare-nosed wombats.

The treatment of mange in wildlife is challenging, and no national treatment guidelines exist. We conducted a literature review, combined with targeted expert interviews and stakeholder consultation, to collate information about sarcoptic mange infection and treatment in Australian mammals.

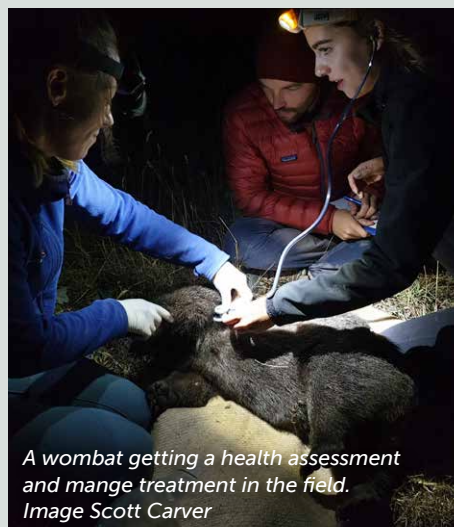
We found that supportive treatment of mange (treatment for the effects of mange e.g., antibiotics for secondary bacterial infection) can greatly improve animal welfare, with treatment more successful in animals in captivity. Treatment initially involves assessment of disease severity, and this depends on the availability of experienced personnel. However, currently no national assessment criteria are available for assessing the severity of mange.

Approved doses of various acaricides have been shown to be effective if treatment courses are sufficiently long and animals are reliably treated; however, this can be difficult in free-ranging wildlife. The volunteer

community is dissatisfied that field experience is not endorsed as an evidence base for treatment regimes. A future challenge will involve merging traditional practice with field experience.

We produced a set of treatment guidelines, and a summary treatment information sheet, for stakeholders directly involved in managing and delivering treatment. Our treatment guidelines outline current principles around whether to treat or euthanise an animal, treatment options, relevant regulations and what information to record. The limited evidence base around sarcoptic mange treatment in Australian wildlife emphasises the need for further research and collaboration.

Our guidelines can serve as a starting point for critical future research.



*A wombat getting a health assessment and mange treatment in the field.
Image Scott Carver*

Background

Sarcoptic mange, caused by the mite *Sarcoptes scabiei*, is an emerging infectious disease that is impacting multiple native species. It was probably introduced to Australia with European settlers and their domestic animals and has since spread to native mammals, including the koala, agile wallaby, swamp wallaby and southern brown bandicoot, and is considered the most significant disease threat faced by wild wombats. Sarcoptic mange in wild populations is often chronically debilitating and causes significant illness and mortality.

Sarcoptic mange has caused the decline and possible extirpation of some bare-nosed wombat populations in south-eastern Australia and persists as a significant animal welfare issue in others. Sarcoptic mange was publicly nominated as a Key Threatening Process in the 2019 round of consultation on the Environment Protection and Biodiversity Conservation Act 1999. Despite the significance of the disease, relatively little is known about how best to manage sarcoptic mange in the Australian landscape.

Significant time and resources are expended in treating wombats suffering from the disease, and there is a strong desire for more guidance around treatment regimes.



Background (continued)

Community expectations about appropriate treatment of mange-affected wildlife is growing, due to the significant welfare implications of this disease and uncertainty around its animal welfare and conservation impacts.

Most treatment-related research is now one to two decades old, and earlier recommendations for further work have not been actioned or funded. While research into treatment in a controlled setting has shown relatively predictable outcomes, effective treatment of wild populations is much more complex. Treatment of mange in free-ranging wildlife by volunteers has developed in an ad hoc fashion partly due to this lack of research and clear communication, with significant differences in treatment practicalities and outcomes in captive versus free-ranging animals.



*A southern brown bandicoot with mange.
Image: Yasmin Hunter*

Main aims

This project aimed to establish national guidelines for the best practice treatment of Australian wild animals with sarcoptic mange. In the process, we aimed to expand the dialogue between parties involved in wildlife mange treatment in Australia. We also wanted to highlight knowledge gaps that require further investigation, to enable the production of more comprehensive guidelines in the future.



What we did

This project brought together all the literature on mange infection and treatment in Australian wildlife into one document. We reviewed the peer-reviewed and grey literature, and interviewed wildlife veterinarians and experts, as well as staff of government agencies, to summarise current research and knowledge around sarcoptic mange infection and treatment in Australian wildlife. We combined this information with government policy documents (e.g., permits and Codes of Practice) and anecdotal sources (e.g., observations from veterinarians and wildlife volunteers)

to create contemporary treatment guidelines for mange-affected individuals and populations.

We sought input from the wildlife carer community about what they need in relation to treatment guidance and reflected their input in our recommendations for future work. The resultant guidelines are based on currently available scientific evidence, supported by veterinary knowledge and field experience, and include recommendations on the required next steps to fill the knowledge gaps we identified.

Key findings

We have produced treatment guidelines for stakeholders (e.g., veterinarians, wildlife carers, treaters and rehabilitators) who are directly involved in managing and delivering mange treatment. These guidelines include a two-page mange treatment summary information sheet that will be useful for caregivers to keep on hand.

The literature review highlighted that there is potential for successful treatment of mange with acaricides in some contexts, but that significant challenges remain when treating free-ranging wildlife. We found multiple examples of mange as a disease of concern in Australian wildlife, and published and anecdotal evidence of successful and unsuccessful treatment regimens in individuals and populations.

The key findings identified in the published and unpublished literature, combined with stakeholder input, demonstrate the need for consistent national criteria for the assessment of mange severity. We found that supportive treatment of mange (e.g., antibiotics) can greatly improve animal welfare and the likelihood of recovery. Treatment initially involves assessing the disease severity and the likelihood of the treatment being successful. This depends on the availability of experienced personnel, such as veterinarians and land managers.

Where possible, such as in captive and clinical environments, injectable acaricides should be used, especially in animals that have mange-affected skin. Currently, approved doses of various acaricides (e.g. moxidectin) have been shown to be effective if treatment courses are sufficiently long (which could be in the order of 15 doses over four months in



*A koala with mange on its face.
Image: Adelaide Koala and Wildlife Centre*

a more severely affected animal) and animals are reliably treated; however, this can be difficult in free-ranging wildlife.

New treatments (e.g., fluralaner) are showing promising results in multiple species, but these need to be administered under the direct supervision of a registered veterinarian until these medications become available under permit.

We found that some members of the wombat volunteer community identify as the custodians of a large body of information that requires investigation and validation to progress understanding of mange treatment in free-ranging wombats. There is dissatisfaction in this community that field experience is not endorsed as an evidence base for using higher doses of moxidectin (an anthelmintic drug). A challenge for the future is to incorporate the knowledge gained through field treatment by wildlife volunteers with traditional research to develop optimal treatment strategies for different contexts and enable the alignment of treatment advice.

The clinical signs associated with mange in native Australian mammals are seen in other animals globally. Little knowledge exists about mange transmission dynamics in an Australian context. It appears difficult to eliminate mange from wildlife populations, and infection tends to be easily reintroduced.

Sarcoptid mites are obligate skin parasites, but they have been shown to survive in suitable low-temperature, high-humidity environments not on a host for up to 19 days. The fact that wombats live in and share burrows most likely predisposes them to infection. The burrows could enhance the survival of mites when off the host by providing a stable temperate environment that would facilitate transmission. Wombats also expend low amounts of energy, partly due to their low energy diet and low metabolic rate compared with other herbivores. The energetic burden of mange can therefore lead to severe weight loss in wombats, and this might be why they are impacted more than other Australian mammals.



Recommendations and future research

Our treatment guidelines outline current principles around whether to treat or euthanise an animal, treatment options, relevant regulations and what information to record.

The first iteration of the treatment guidelines will be provided to veterinarians and wildlife volunteers to improve knowledge of sarcoptic mange infection and treatment, thus helping to improve animal welfare and treatment outcomes. As knowledge expands, these guidelines should be updated to consistently reflect best practice and contemporary understanding. It will be essential to establish who will hold ownership of these guidelines and who will be responsible for updates and dissemination.

The limited evidence base around sarcoptic mange treatment in Australian wildlife emphasises the need for further research and collaboration. Uncertainty remains around what constitutes best practice treatment, and we currently lack a nationally coordinated approach to progressing this research.

The next steps revolve around the development of a detailed plan for the following key areas of work, which can be used to direct effort and research funding:

- experimental pharmacokinetic research into optimal drug dose and delivery
- resources (e.g., information, supplies, funding) for mange treatment and decision-making in the field in various contexts
- optimisation of national, state and local management of mange treatment, including integration of field-based knowledge with more traditional research

- investigation into how best to manage mange-affected individuals and monitor treatment outcomes.

This project should be used as a starting point for a second phase of research and stakeholder collaboration to progress the content and application of mange treatment guidelines in Australian wildlife. The creation of a research plan for this important issue will be an important next step in improving the health, welfare and conservation of Australian wildlife affected by sarcoptic mange.



Mange on southern brown bandicoot. Image: ??????????????????????

Work cited

Lee Skerratt, Clare Death, Scott Carver, Jasmin Hufschmid and Anna Meredith. June 2021. *Guidelines for treatment of Australian wildlife with sarcoptic mange*. NESP Threatened Species Recovery Hub Project 1.4.4 report, Brisbane.

Further Information

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