DEPARTMENT OF PRIMARY INDUSTRIES, PARKS, WATER AND ENVIRONMENT

Mange Treatment Protocols and Euthanasia Guidance

For the application of moxidectin (Cydectin®) to treat Sarcoptic mange in wild wombats (*Vombatus ursinus*) in Tasmania

Version 3

July 2020

Contents

1. Sarcoptic Mange in Wombats

Sarcoptic mange is caused by the parasitic mite, *Sarcoptes scabiei*. Research indicates the parasite is of human origin and was introduced to Australia by Europeans and their animals. It can affect various mammalian species but has its greatest impact on the common wombat, *Vombatus ursinus*, particularly in southeast Australia.

Sarcoptic mange in wombats generally occurs at low prevalence, but epizootics occur sporadically within populations. Based on night-time surveys at locations around Tasmania, the average prevalence of wombats with visible mange is generally less than 5%, although prevalence rates can vary between sites and over time. Outbreaks of mange in wombats are anecdotally associated with times of nutritional stress, adverse weather and/or overcrowding. Susceptibility of individual wombats varies, and transmission between animals is exacerbated by burrow sharing. Survival of mites is affected by environmental conditions, with laboratory studies showing cool, humid conditions lead to longest survival of mites away from their hosts (up to three weeks).

Whilst mange in wombats typically persists in populations at low levels, major outbreaks can significantly reduce the abundance of wombat populations in localised areas. Humane euthanasia is a considered and appropriate option for severely debilitated wombats.

2. Legislative Obligations for Mange Treatment of Wombats in Tasmania

Moxidectin (Cydectin®)

Using moxidectin (Cydectin®) to treat wombats with mange in Tasmania falls under both State and Federal legislation.

The common wombat is protected under Tasmanian state legislation in the *Wildlife (General) Regulations 2010* of the *Nature Conservation Act 2002*.

Since moxidectin (Cydectin®) is currently classified as 'off-label' for use on wombats, this activity falls under the Federal *National and Veterinary Chemicals Code Act 1994*.

In accordance with the legislation above, two permits are required to use moxidectin on wombats in Tasmania:

1. A "Permit to Take" from DPIPWE is required where a wombat is to be treated via the 'pole and scoop method'; and
2. A permit from the Australian Pesticides and Veterinary Medicines Authority (APVMA) under the national *Agricultural and Veterinary Chemicals Code Act 1994* is required for the use of moxidectin (Cydectin®).

On 15 June 2020 the Wombat Protection Society of Australia LTD (WPSA) was granted a permit by the APVMA for the use of moxidectin (Cydectin®) to control mange in wombats. This

permit is in force until 30 June 2023. All wombat mange treatment groups must receive written authorisation from WPSA before using moxidectin (Cydectin®).

The APVMA permit can be found here: http://permits.apvma.gov.au/PER89040.PDF

How do I apply for permits?

For a Permit to Take contact DPIPWE's Natural and Cultural Heritage Division
Phone: (03) 6165 4305
Email: wildlife.reception@dpipwe.tas.gov.au

Note: a "Permit to Take" is not required where a wombat is required to be humanely euthanased for animal welfare reasons (see Attachment 1 for assessment guidelines).

For a permit from the APVMA contact the Wombat Protection Society of Australia Ltd
Email: mange@wombatprotection.org.au

Fluralaner (Bravecto®)

Research into the safety and efficacy of fluralaner (Bravecto®) is underway, and there is currently no authorisation from the APVMA for its use on native wildlife. Fluralaner (Bravecto®) can only be used on native species under the direct supervision of a registered veterinary practitioner.

3. Mange Treatment Protocols

The following protocols provide guidelines for moxidectin (Cydectin®) use in line with APVMA Directions and Conditions of Use.

Preparation

- Effective treatment is dependent on the availability of access, equipment and personnel to deliver a full course of the recommended medicine. A major cause of treatment failure is when repeat delivery of the full course of treatment is not achieved.

- Moxidectin (Cydectin®) Pour On must only be used by individuals who have been trained in classifying the stages of mange infection and observation of toxicity signs.

- Every effort to identify individuals must be taken to ensure they are only receiving a once weekly treatment; this can be by using mange patterns, scars, fur colour or any other identifying feature. Adding red, blue or green food dye to the moxidectin (Cydectin®) is recommended to identify whether an individual has been treated recently. Paint is not recommended as it may interact with the moxidectin (Cydectin®).

- Knowledge of all burrow locations of affected individuals is essential if burrow flap treatment methods are to be used effectively. Camera data indicates that wombats may try to avoid burrows with flaps on them; therefore it is necessary to put flaps on all burrows found and to search regularly for newly dug ones, as well as replace flaps that may have been destroyed by wombats.

- Sarcoptic mange is infectious and can be transferred to humans (zoonotic disease) and other animal species; therefore, care must be taken to prevent the spread of the disease. Permit holders must undertake strict personal hygiene routines, including wearing protective clothing and thorough washing of hands and equipment.

Treatment Application

- Application of moxidectin (Cydectin®) is the current widely accepted method to treat mange infected wombats in the wild.

- There is currently no clear evidence that treatment of wild wombats using moxidectin (Cydectin®) by pole and scoop and/or burrow flap methods can be successful at a population level, especially if mites remain present in the environment, but can be successful for individual wombats.

- Pole and scoop treatment can only be undertaken during daylight hours, as individuals are harder to identify at night.

- It can be difficult to ensure that each wombat receives a full course of treatment. Burrow flap methods are recommended over direct application by pole and scoop alone, because wombats become more difficult to approach as their health improves.

- According to the APVMA's 2020 recommendations the **weekly treatment dose** rate of moxidectin (Cydectin®) Pour On (active ingredient moxidectin 5g/L) for a wombat with mange is **0.8 ml per 1 kg body weight**. The average weight of an adult wombat is 25-35 kg. **No more than 20 ml** of moxidectin (Cydectin®) must be applied per weekly treatment.

- Apply to the skin on the back of mange-affected individuals weekly for fifteen weeks. Wombats with visible lacerations along the backline should not be treated with moxidectin (Cydectin®).

Record Keeping

- Records must be kept of all wombat treatments to assist with correct treatment and so that we can learn from the treatment process and improve the treatment of wombats. Information to record includes: amount of moxidectin (Cydectin®) used, mange severity and body condition (see Attachment 2), number of burrow flaps deployed, fate of treated wombats. An example recording sheet is provided in Attachment 3 and may be used or modified. Taking images of the wombats before, during and after treatment is encouraged.

Toxicity and Resistance

- The risk of toxicity to animals is believed to be low for administration of moxidectin (Cydectin®) at the recommended dose and frequency outlined above, however acute (immediate) poisoning is more likely to occur than chronic (long term) due to less body fat carried by mange-affected wombats
- Resistance of mites to moxidectin (Cydectin®) has not been documented to date. However, continued or long-term use of the drug on mite-infested wombat populations could lead to the development of resistance in mites and caution should therefore be exercised when carrying out long term treatment at a population level.

Orphaned Wombats

- Orphaned wombats may be discovered in the course of treating wombats for mange. These must be reported to DPIPWE's Natural and Cultural Heritage Division by phone or email immediately. Alternatively, Bonorong Wildlife Rescue can be contacted after hours for assistance (0447 264 625).
- A permit is required to rehabilitate a wombat and release it back into the wild. Wombats are not suitable for novice carers and are best cared for by an experienced wildlife rehabilitator.

4. Euthanasia

Wombats severely affected by mange are unlikely to recover owing to other complicating factors and may require euthanasia on animal welfare grounds.

As a guide, euthanasia of a wombat is acceptable and should be considered if one or more of the following signs are present:

- The animal is extremely thin and emaciated.
- Infected smelly wounds or flystrike.
- Severe facial crusting leading to apparent blindness, difficulty breathing or eating.
- 50% or more of the side of the animal is subject to hair loss and mange related thick scabs and crusts.

The *Animal Welfare Act 1993* prescribes penalties for persons who do not kill animals in a humane manner. It is that person's responsibility to kill an animal in a manner that does not cause unreasonable and unjustifiable pain and suffering to that animal.

These protocols provide clear instructions which, if followed, will ensure that the killing of a mange affected wombat is conducted as efficiently as possible with the minimum of suffering.

For more information:

Department of Primary Industries, Park, Water and Environment
Natural and Cultural Heritage Division

Phone: (03) 6165 4305 during business hours (*after-hours a recorded message will provide further information)*

Email: Wildlife.Reception@dpipwe.tas.gov.au

Visit our Webpage: www.dpipwe.tas.gov.au/wombats

Attachment 1: Euthanasia criteria for wombats affected with mange

1. Treating Wombats with Mange

Wombats showing early signs of mange can be treated given appropriate circumstances. Wherever possible mange-affected wombats should be treated in the wild. Holding a wombat in captivity comes at some risk to the wombat due to stress associated with capture, handling and confinement. This stress is exacerbated in mange-affected wombats whose immune systems are already compromised.

Effective treatment is dependent on the availability of infrastructure and personnel to deliver a full course of the recommended medicine. A major cause of treatment failure is when repeat delivery of the full course of treatment is not achieved. Topical treatments need to be delivered onto a non-scabby area of skin repeatedly over a period of four months. Protocols for treating mange affected wombats can be found on the DPIPWE website www.dpipwe.tas.gov.au/wombats

2. Assessing Mange and the Possible Need for Euthanasia

When assessing mange, the extent and severity of mange should be evaluated on the condition apparent on the side of the animal (see image below). The back and the rump of the wombat are not as appropriate for assessment as these areas are prone to skin aberrations that are typically not the result of mange.

Wombats severely affected by mange are unlikely to recover owing to other complicating factors (e.g., secondary infections, compromised immune system) and require intensive treatment or, if this is not possible, euthanasia on animal welfare grounds.

As a guide, euthanasia of a wombat is acceptable and should be considered if one or more of the following signs are present:

- The animal is extremely thin and emaciated.
- Infected smelly wounds or flystrike.
- Severe facial crusting leading to apparent blindness, difficulty breathing or eating.
- 50% or more of the side of the animal is subject to hair loss and mange related thick scabs and crusts.

Hair loss may also occur as a result of fighting wounds, so it is necessary to look for signs of crust development, and other allied signs of mange. The images in Attachment 1 provide examples of individual wombats of different health status and recommended management options.

3. Euthanasia Methods

Recommended euthanasia methods are:

- Gunshot to the head, so as to hit the brain, by an appropriately licenced and competent shooter using a minimum .22 calibre firearm at close range.
- Administration of sedation/anaesthesia and euthanasia solution by a registered veterinary surgeon.

Correct disposal of a wombat carcass after chemical euthanasia is essential to prevent secondary poisoning of scavenging animals, and to prevent spread of mange mites. Recommended methods include deep burial (at least 1m deep), complete burning, or bagging for disposal by a veterinary clinic.

Detailed guidelines for euthanasia of mange affected wombats are available from DPIPWE: Wildlife.Reception@dpipwe.tas.gov.au

APPENDIX 1:

HEALTHY WOMBAT – NO ACTION

MANGE AFFECTED WOMBAT – *TREATMENT APPROPRIATE IF LOGISTICALLY POSSIBLE,*

MANGE AFFECTED WOMBAT – *EUTHANASIA RECOMMENDED*

Photo Credits: K. Lovell, S. Carver

Attachment 2: Wombat mange scoring guidelines

1. Introduction

These wombat mange scoring guidelines have been developed to provide assistance with surveying and assessing prevalence of mange in wombats to ensure consistency between surveys undertaken by different groups (e.g. DPIPWE (including PWS), University of Tasmania, Tasmanian Land Conservancy, community and volunteer groups).

Mange can be assessed by direct observation and camera surveys. Mange prevalence can also be assessed from road kills, although noting that mange-affected wombats may be more likely to have collisions with vehicles.

2. Body Condition and Mange Scoring

Mange causes hair loss, skin discoloration, thickening and crusting, open wounds and weight loss. These signs become more clear and severe as the disease progresses.

Body condition

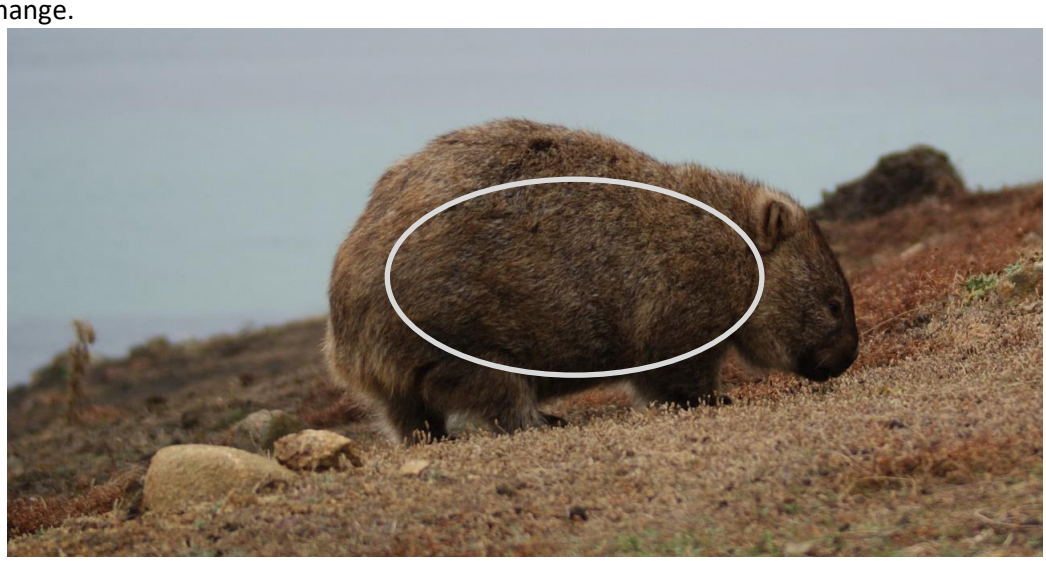
Body condition is scored from a scale of A (very good) to D (poor)

Body Condition Score	Body Condition
A	Very good: fat, glossy coat appearance
B	Good: healthy appearance
C	Moderate: pelvis/ribs may be visible
D	Poor / extremely poor: emaciated or extremely thin

Modified from Woolnough, AP Foley, WJ, Johnson, CN, Evans, M. (1997). Evaluation of techniques for indirect measurement of body composition in a free-ranging large herbivore, the southern hairy-nosed wombat. Wildlife Research 24: 649–660.

Mange severity

When assessing mange, the extent and severity of mange should be evaluated on the side of the animal (see image below). The back and the rump of the wombat are not as appropriate for assessment as these areas are prone to skin aberrations that are typically not the result of mange.



Extent of mange is scored according to the following criteria:

Mange Score	Hair Loss	Mange Severity Status
0	No sign of mange observed	Healthy
1	Ambiguous, possible hair thinning/skin reddening	Likely healthy
2	<10% of segment affected by mange	Early mange
3	10-40% of segment affected by mange	Moderate mange
4	40-60% of segment affected by mange	Severe mange
5	60-100% of segment affected by mange	Late stage mange

Modified from Simpson K, Johnson CN, Carver S (2016) *Sarcoptes scabiei*: The Mange Mite with Mighty Effects on the Common Wombat (*Vombatus ursinus*). PLoS ONE 11(3)

Confidence in mange assessment

Record the confidence you have in the quality of your observations and assessments as follows:

Score	Description
High	at least one side of the wombat clearly observed
Medium	One side of wombat not clearly observed due to distance from observer, speed of wombat, direction of travel by wombat, and/or vegetation, etc
Low	Wombat poorly observed due to distance from observer, speed of wombat, direction of travel by wombat, and/or vegetation, etc
Not assessed	Wombat too far away, obscured by vegetation, disappeared too quickly

Attachment 3: Examples of data sheets to record cydectin treatment

Example 1: Treatment of Individual Wombats (these may be modified to suit individual circumstances but the same types of information should be recorded)

Wombat ID/Description:					
Location where treatment is occurring (name of location and grid reference if possible):					
Date of treatment	moxidectin (Cydectin) dose (mL)	Mange severity score	Body condition	Name of person treating	Notes
Post-treatment observations (where possible)					
Date of obs.		Mange severity score	Body condition	Name of observer	Notes
Document whether treatment was completed or not and the possible/actual fate of wombat:					

Example 2: Treatment of an area using burrow flaps

Location where treatment is occurring (name of town/suburb and grid reference if possible):				
Number of burrow flaps deployed:			Estimated area (ha) flaps deployed over:	
Estimated number of wombats:				
Number of wombats observed with mange and their mange severity scores				
Date of treatment	moxidectin (Cydectin) dose (mL)	Flap number or numbers	Name of person treating	Notes
Post-treatment observations				
Estimated number of wombats:				
Number of wombats observed with mange and their mange severity scores:				