

Husbandry Guidelines for Woma



Aspidites ramsayi (Reptilia: Boidae)

Compiler: Sian Gildon

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Lecturer: Graeme Phipps, Jackie Salkeld, Brad Walker

DISCLAIMER

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OCCUPATIONAL HEALTH AND SAFETY RISKS

- This animal has the ability to bite, causing pain and the possibility of secondary infections due to bacteria housed in the mouth.
- As a python, this animal has a very strong musculature system and relies on constriction to kill its prey. This constriction if applied to a human may cause pain and possible injury depending on the size of the snake.
- There is a risk of contracting salmonella from this animal if proper hygiene isn't observed after handling.
- There is a risk of contracting tetanus from this animal if it is handled with an open wound.

Zoonotic hazards which may be contracted from this animal include:

- bacteria
- protozoa
- fungi
- viruses
- parasites

Take precautions when handling the animal; know the signs of stress which generally predetermine a bite or constriction. These include excessive hissing, agitated and fast movement, tongue flicking and being noticeably ready to shed.

Be aware of safe hygiene practices such as using F10 hand gel before and after handling each animal, washing hands strategically with the appropriate hand wash before consuming food will prevent contracting salmonella.

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1 Introduction

The *Aspidites* genus is unique among the Python family. They are the only known genus to have either no or minimal heat sensor pits and lives predominately off reptilian prey. This python, previously held in captivity only under a Class II restricted license, has just been downgraded to a Class I unrestricted license. This is a great advancement for the species as there will be more awareness for the necessary conservation of this species. The Woma is an attractive python with a fantastic temperament, which makes it perfect for use during educational displays.

This python is currently being used in conservation research for other native species like the Bilby. Conservation funds such as Australian Wildlife Conservancy purchase lands and proceed to make them feral-proof. After eradicating the ferals within a fenced off area, native Fauna is reintroduced to the area.

Womas are introduced into these areas to play a part in population control for both the reptiles and mammals found within the fence. All introduced animals are tagged with a radio-tracking device and monitored. The information which is recorded is crucial to the survival of many species of Australian fauna.

1.1 ASMP Category

I have found no details concerning this species and an ASMP.

1.2 IUCN Category



[Endangered \(IUCN 2.3\)](#)

1.3 EA Category

Any movement or transfer interstate needs to have the correct permits from the Department of Environment and Climate Change.

In all states it is illegal to remove specimens from the wild populations without prior notice and approval.

1.4 NZ and PNG Categories and Legislation

This snake does not occur in New Zealand or Papua New Guinea.

1.5 Wild Population Management

There is no known wild population management being currently undertaken.

1.6 Species Coordinator

Unknown.

1.7 Studbook Holder

Unknown.

2 Taxonomy

2.1 Nomenclature

Class – Reptilia

Order - Squamata

Family - Pythonidae

Genus - *Aspidites*

Species - *ramsayi*

2.2 Subspecies

N/A

2.3 Recent Synonyms

Aspidites ramsayi

(Macleay, 1882)

Synonyms

Aspidiotes ramsayi - Macleay, 1882

Aspidites ramsayi - Boulenger, 1893

Aspidites collaris - Longman, 1913

Aspidites melanocephalus ramsayi - Loveridge, 1934

Aspidites melanocephalus ramsayi - Stull, 1935

Aspidites ramsayi - Cogger, Cameron & Cogger, 1983

Aspidites collaris - Wells & Wellington, 1984

Aspidites ramsayi - Underwood & Stimson, 1993[1]

2.4 Other Common Names

Sand python or Ramsay's python

3 Natural History

3.1 Morphometrics

3.1.1 Mass And Basic Body Measurements

Hatchling – 40cm

Male (adult) – 150cm

Female (adult) – 160cm

The scalation is smooth, with 50-60 mid body rows, 280-315 ventrals, single anal and 40-45 mostly single subcaudals. Some posterior subcaudals are irregularly divided. This snake grows to the same size as the Black-headed Python, averaging 1.5 metres in length although some have been recorded as long as 2.5 metres (Krefft).

3.1.2 Sexual Dimorphism

Both sexes possess small cloacal spurs. Females are generally the larger of the two sexes both in length and weight. Males generally have a longer tail when measured from the anal plate.

3.1.3 Distinguishing Features

This species is olive-brown to reddish-brown above with darker cross-bands along the length of the body (from the neck to the tail-end). Its background colour is a glossy yellow or reddish brown to a pale green-brown. This is accompanied by numerous dark transverse bands on the body and tail. The underside is cream to yellow, with several pink or brown blotches. Juveniles bear a dark patch over each eye, which may persist into adulthood. The head is only slightly wider than the neck.

These python's lack the external sensory heat pits which are found in all other pythons. This may be partially due to the snake's habit of consuming primarily reptilian prey, in which case they wouldn't need the sensitivity of heat pits for tracking prey. There has

been recent research to show that Woma's do have minimal heat pits which seem to be located within the mouth and not externally as seen in other pythons. This seems to suggest that the snakes habit of digging and burrowing in the sand may impair the use of the pits.

Different localities have slightly differing appearances: Tanami, South-east Queensland, South Australian, Uluru, Western Australian. They range in the colours described above.



Pic 1: Tanami Locality



Pic 2: South Australian Locality



Pic 3: Queensland Locality



Pic 4: Western Australian Locality



Pic 5: Uluru Locality

3.2 Distribution and Habitat

This species is found in the Australian interior, from central Australia into the south-western edge of Queensland, and into northern South Australia. There is also one coastal area in north-eastern Australia around the Pilbra coast where this species is found.



Fig 1. Map of Australia showing the distribution of the Woma

3.3 Conservation Status



[Endangered](#) (IUCN 2.3)

3.4 Longevity

3.4.1 In the Wild

Recent statistics suggest that the Woma will average around 15 years in the wild.

3.4.2 In Captivity

Around 15-18 years in captivity should be achieved.

3.4.3 Techniques Used to Determine Age in Adults

It is difficult to determine the age of pythons without prior knowledge of the history of the individual snake. Snakes generally grow in accordance to the amount they eat.

Studies are currently being carried out on various species with regards to the growth rates of pythons in relation to the weight of the food product. General statistics show that the smaller the food product, the slower the growth rate.

Once the snake reaches 1.5 metres in length, it is generally safe to assume that the animal is over 5-6 years of age.

4 Housing Requirements

4.1 Exhibit/Enclosure Design

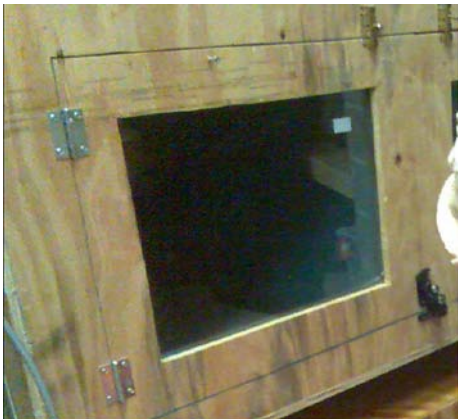
All captive reptiles must be kept in conditions that ensure temperatures, humidity and light cycles are appropriate to the species and allow normal physiological functioning and behaviour (Standards for Exhibiting Reptiles).

A basic exhibit should include; glass for viewing, mock rock for aesthetics, heat lamps for thermoregulation, hide areas, vegetation, watering area and furniture such as rocks, logs and branches. Substrate should be red desert sand to blend into the aesthetics and general theme of the enclosure.

4.2 Holding Area Design

The enclosure should be made out of wood such as MDF or pine, as this maximises heat retention in the enclosure. For ease of maintenance the enclosure should be lacquered.

The enclosure should have a glass door to allow for sighting the animal within and there should also be provisions for a heat globe.



Pic 6: Reptile holding area at Sydney Wildlife World.

4.3 Spatial Requirements

The minimum floor area for a single terrestrial snake is 20cm x 30cm or $0.3L^2$, whichever is greater, with no dimension less than $0.3L$.

The algorithm used to determine the correct enclosure size for a single terrestrial snake is as follows:

$$0.6L \times 0.5L = 0.3L^2$$

The minimum height required is 0.3L (Standards for Exhibiting Reptiles).

4.4 Position of Enclosures

For manual handling requirements, off display enclosures should not be above shoulder height or below knee height.

On display enclosures should be at maximum visual display for the customer's experience, with back of house areas designed for the keeper's safety.

As most reptiles on display are normally indoors the enclosure does not need to face a particular direction.

4.5 Weather Protection

When keeping Woma's outdoors, good protection from the elements is essential.

Protection from both heat and rain is necessary; this can be achieved by providing rocky outcrops or a den. Woma's are desert animals so will also require supplement heating in the cooler areas of Australia or during the cooler months of the year. This may be in the form of an electronic basking rock or a den heated with heat/infra red lighting or ceramic heat bulb.

Care must be taken if keeping Woma's outside; this snake is a proficient digger and may find the smallest possible escape route.

4.6 Temperature Requirements

The Woma is an arid species so they require warm temperatures.

The enclosure must be heated by day; this is best achieved by a heat source such as heat globes or an infra red heat lamp. The enclosure should have a thermal gradient maintained with a thermostat of between 25°C – 37°C. All heating and lighting should be turned off overnight to allow for natural nighttime stimuli.

4.7 Substrate

In off display enclosures newspaper or butchers paper is a sufficiently cost effective and hygienic substrate which allows for natural behaviours such as hiding.

On display enclosures should portray a natural environment using a red-desert sand substrate. If cleaned and changed regularly this substrate should not conceal parasites or bacteria. This substrate also allows for extensive natural behaviours such as burrowing.

4.8 Nest-boxes and/or Bedding Material

There should be two size appropriate hide boxes made available, one at each end of the thermal gradient. This allows the snake to thermoregulate with the comfort of a hide.

Bedding material may be in the form of shredded newspaper or sand. My personal Woma prefers either paper towel or the soft lining of an insulated lunch box when given the choice of several different bedding materials.

4.9 Enclosure Furnishings

Furnishing should include; a large rock or rocky outcrop to allow for easy sloughing. Plants such as Spinifex allow for a natural appearance and also give the snake a false sense of security so it feels as if it is hidden. Substrate should be red-desert sand with rocky areas to allow for basking.

5 General Husbandry

5.1 Hygiene and Cleaning

All enclosures should be disinfected before and after use. If changing occupants, the enclosure should be disinfected and left for around two weeks to minimise bacteria and pathogen spread.

Routine cleaning:

What disinfectant to use:

- F10 is effective against bacteria, fungi, viruses and spores. It is safe for reptiles and people. It is non-toxic, non-corrosive and biodegradable.

Thoroughly clean each enclosure once a week:

Back of house cleaning:

- Remove the snake and place it in an appropriate holding bin (a plastic garbage type bin is a cheap option, or you can use custom made bins).
- Throw away the paper substrate using a plastic bag which is tied and put in rubbish bin.
- Scrub the enclosure and furnishings with a brush and soapy water making sure to remove any residue.
- Disinfect enclosure and furnishings with F10; allow to soak for several minutes and rinse.
- Allow enclosure to air dry before putting in clean substrate and furniture, this can be assisted by wiping down with paper towel.
- Return the snake to the enclosure.

Exhibit cleaning:

- Remove the snake and place it in an appropriate holding.
- Remove furnishings from the enclosure and scrub with soapy water to remove residue.
- Disinfect furnishings with F10; allow to soak whilst cleaning the sand, then rinse.
- Sift sand thoroughly; removing all bulk matter including faecal matter and old browse debris.
- Clean windows with water.
- Replace furnishings in different positions for enrichment.
- Return snake to the enclosure.

5.2 Record Keeping

Each animal should have an individual record diary which outlines significant and insignificant details such as:

- Date of arrival, location of purchase and previous details (e.g. sloughing, feed, medication).
- Feeding schedules (what was fed and whether or not it was taken).
- Weight records (recommended weighing every 2-3 months, more frequent if it's a younger animal).
- Medication schedules.
- Date of sloughing.

5.3 Methods of Identification

Methods of identification may include the following;

- Individual cage cards with an individual code and distinguishing markings noted.
- Photographs
- Personalised description
- Microchip

5.4 Routine Data Collection

Data collection should be completed daily; this will ensure the health and wellbeing of the snake.

An individual diary should be kept on hand for each animal; this will outline any significant or insignificant changes in the animal's behaviour, feeding routine and health status.

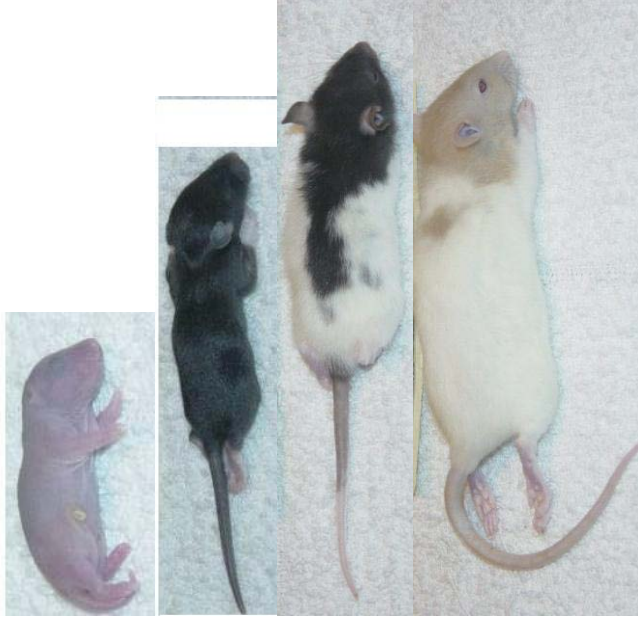
6 Feeding Requirements

6.1 Diet in the Wild

Woma's feed on a variety of terrestrial vertebrates, predominantly reptiles. This python is an opportunistic feeder and will feed on anything available. This includes rodents, snakes and lizards. The python has also been witnessed using the Caudal Luring technique most commonly seen by the Death Adder (*Acanthophis*). This technique involves the snake hiding in leaf litter or camouflaged against the sand, lying with the tail wrapped near the nose; maintaining a very still body whilst flicking the tip of the tail constantly. The aim is to attract small prey by having the appearance of a worm or suchlike.

6.2 Captive Diet

The captive diet is size dependant. In a zoological institute rodents are the staple diet for Woma's. As a hatchling, weaner mice or pinkie rats are appropriate sizes. These will be gradually increased as necessary for the python's needs, from weaner rats through to full grown rats. Generally speaking, a python can consume a prey item which is three times the size of the largest section of its body. This is a good key to use when feeding new animals. As rodents have a higher fat content than the python's normal reptilian diet, care has to be taken to not over-feed the Woma as they have a tendency to become overweight and suffer from fatty deposits. Feeding can range from every 5-7 days up to once a month depending on the condition and age of the Woma. This regular diet will only change in the circumstance of hibernation or 'cooling down' for breeding purposes, in which case the animal may not feed for 4-6 months.



Pic 7, 8, 9 and 10: Different sizes of Food Quality rats; Pinkie, Fuzzie, Weaner, Adult.

6.3 Supplements

Supplements are generally unnecessary in a python diet as rodents are a complete meal containing the necessary nutrient requirements. If a supplement is required, e.g. for a juvenile, a commercially available supplement such as ‘Reptivite’ may be added to the food.

6.4 Presentation of Food

In a zoological environment Woma’s would normally be fed once a week or once a fortnight, for a full grown specimen an adult rat would be adequate. This would be prepared as follows;

- Handle rat in gloves at all times as the scent is held on the skin and clothes.
- Humanely euthanise the rat (co2 gas) and freeze for future use, or purchase pre-frozen feed items.
- Defrost the rat in fridge up to 24hrs in advance of feeding time.
- Warm rat to body temperature (this can be done in several ways: e.g. placed in a warm water bath or heated on a bain marie).
- Grasp hind end of the rat in long tongs or pincers.

- Wriggle the rat in a motion to simulate movement in the line of sight of the Woma
- Wait for contact to be made between the snake and the rat
- After feeding is complete, sanitise implements and hands with the appropriate solution e.g. F10 gel or wash.



Pic 11: Woma feeding.

7 Handling and Transport

7.1 Timing of Capture and Handling

The capture of most reptiles should be performed in the early morning before the snake has a chance to warm up. In the case of the Woma as it is predominately nocturnal, capture should be undertaken several hours after the animal has settled down for the day.

7.2 Catching Bags

Collecting bags:

Collecting bags are made out of a light and strong fabric such as calico, and are sized appropriate to the animal you are intending on restraining. They generally have a longer length as opposed to width. The bag should carry enough depth to prevent the snake from returning out of the opening quickly.

Pillow cases are a good alternative to commercial collecting bags for pythons.



Pic 12: Keeper at Sydney Wildlife World displaying the correct use of a collecting bag

Inverted cloth bags:

This method utilizes the collecting bag. Holding the bag inside out with your hands placed inside, place the bag and hands over the snake (preferably one in a coil, for ease of handling) and surround the snake with the bag, turning the bag right way in with the snake now on the inside of the bag, safely restrained.



Pic 13, 14: Keeper at Sydney Wildlife World displaying the correct method of using an inverted cloth bag

Hoop bags:

This bag allows for safe handling of wild or aggressive animals with the safety of an extended handle which also serves to keep the bag open.

These may be constructed out of collecting bags, or commercially available hoop bags which are deeper and made out of a heavier grade material.

At the base of the bag there should be a reinforced strip to allow for the non-invasive removal of the snake without the possibility of hands coming into contact with the snake.



Pic 15: Keeper at Sydney Wildlife World displaying correct use of the hoop bag.

7.3 Capture and Restraint Techniques

Free handling:

This is the least upsetting handling method for the snake. The animal is gently moved through the keeper's hands, applying only subtle restraint upon the snake.

Tailing:

This method involves gripping the snake close to the vent and lifting the body away from the ground. If handling a long snake, the use of a snake hook to support the snake at a safe distance from you is advisable. This method is for temporary means only, and the snake should be placed in a holding bin or hoop bag as soon as possible.

Pinning:

The snake is normally tailed then restrained with a jigger across the neck, which will hold the head firmly and securely. This normally pre-cursors manual handling such as a head restraint maintained with the hand.

Collecting bags:

Animals are placed in collecting bags using varied techniques such as:

- Using the pinning method, then placing the body and head of the snake deep into the bag before releasing the head.
- Dropping a tailed snake headlong into the bag which is being held open by an assistant.

Hoop bags:

The snake is normally tailed and then gently dropped into the bag which is then quickly twisted and knotted. The snake can also be guided into the bag from the floor if the hoop section shows the snake an area into which the snake will seek safety.



Pic 16: Hoop bag without the rigid hoop (left), standard collecting bag (right)

Snake hooks:

The purpose of the hook is to predominantly support the body during movement, provide assistance in bagging the snake and as a general tool to use in an enclosure.



Pic 17: Selection of tools in order from top to bottom – Jiggers, hoop for hoop bag, two forms of grippers (food tongs, if padded correctly they can also be used as a snake grip) and snake hook.

Tubing:

Plastic tubes provide one of the safest methods of restraining an aggressive snake. They are used by introducing a snake into a size appropriate tube, one that is a little larger than the snake's own diameter. The keeper can then handle the snake with the safety of the tube. This allows the keeper to perform simple tasks such as probing and injections.



Pic 18: Varied sized tubes as used at SWW.

Holding bins:

Holding bins are tall, round plastic containers with clip on lids. These bins are best suited to short term holding such as when feeding, cage cleaning and separating individuals.

7.4 Weighing and Examination

When the snake has been restrained in a collecting or hoop bag, it can then be placed on a set of scales. The correct weight of the animal is the weight shown with the weight of the bag subtracted.

Examinations can be performed whilst the snake is being free handled or tubed depending on the snake's individual personality.

7.5 Release

Free handling:

To release from free handling, place the bulk of the animal in the area to be released whilst still maintaining control of the head. Turn the head away from your body, face it slightly downwards and release the head. This allows the snake to see an escape path immediately and minimises the chance of a snake turning back to bite.

Tailing:

Once the snake is in the required area, be it a bag or enclosure, simply release the tail and allow the snake to move away to a comfort zone.

Pinning:

After gaining control of the head in a restraint grip, remove the jigger slowly.

Collecting bags, inverted cloth bags and hoop bags:

Place the bag on the floor of the enclosure, grasp one of the reinforced corners of the bag and slowly tip the bag upwards allowing the snake to emerge from the bag into the security of its enclosure.

Snake hooks:

Place the first third of the snake's body in the enclosure using the hook, while the rest of the snake is being tailed. As the snake moves off the hook and into the enclosure, close the door over slightly and release the tail.

Tubing:

As you are using a tube which is slightly larger than the diameter of the snake's mid-body, the snake is able to remove itself from the tube once the handler has released the grip holding the snake in the tube. Allow the snake to back out of the tube in slow increments. As the snake's head nears the end of the tube, hold the head in a head restraint and release as the free handling technique.

Holding bin:

Depending on the temperament of the snake, releasing from a holding bin can be done in two ways;

- using the hooking method to gather the snake from the bin and into the enclosure
- free handle the snake out of the bin and into the enclosure.

7.6 Transport Requirements

Taken directly from the IATA standards.

7.6.1 Box Design

For general transport purposes, these species will be carried only in closed and adequately ventilated containers. The container must be well constructed and able to withstand other freight damaging it or causing the structure to buckle or collapse. It must be constructed of non-toxic materials. Chemically impregnated wood may be poisonous and must not be used. The container must be suitable to keep the species inside at all times and protect it from unauthorized access. The door or lid must be constructed so that accidental opening cannot occur, either from the inside or the outside.

The container must be rigid enough to prevent the animal escaping through gaps at the seams or joints. The container must not cause injury to the animal. All inside edges must be smooth or rounded. There must be no sharp projections, such as nails, upon which the animal can injure itself. The container must be clean and leak proof. If it is to be reused, the container must be thoroughly cleaned and then disinfected or sterilised prior to reuse. The container must protect the handlers from being bitten by the animal. Handles and/or spacer bars must be provided to facilitate handling and preventing the ventilation openings becoming blocked by other the freight. (IATA)

7.6.2 Furnishings

There should not be any furnishings included in the shipping containers or cloth bags when shipping snakes, (IATA)

7.6.3 Water and Food

The need to feed or water this species during the normal transport time must not arise. Under severe delay and under certain circumstances watering may be recommended if advised by a specialist. (IATA)

7.6.4 Animals per Box

Because the Woma is cannibalistic, it should be packed singly in any transport box.
(IATA)

7.6.5 Timing of Transportation

Early to mid morning is the best time for transport as the snake is naturally more subdued at this time. The main requirement is that the temperature is kept above 15°c and below 29°c.

7.6.6 Release from Box

As the snake will be restrained in a collecting bag within the transport box, the release has been explained in section 7.4.

8 Health Requirements

8.1 Daily Health Checks

Distance examination consisting of observing the general appearance, faecal output, water levels and state of enclosure.

Observations include the position of the snake within the enclosure, whether or not the snake is under the heat lamp, or has not recently moved since the last observation.

When feeding the snake, careful monitoring is necessary to assess its' demeanor, if it's hungry, aggressive, or not hungry.

8.2 Detailed Physical Examination

8.2.1 Chemical Restraint

Chemical restraint is not common in pythons without the necessity of surgery; many snakes can simply be physically restrained with less stress to the animal.

If chemical restraint is necessary, various substances may be used. The use of these substances must be performed by a veterinarian due to the risk to the animal. Under anaesthesia snakes may lose too much heat, causing hypothermia. To counteract this, the surgery should be performed on an electronic heat mat to help retain heat within the animal.

8.2.2 Physical Examination

Physical examination includes a detailed observation of the scales, vent, mouth and airways. Physical restraint as described in section 7.2 is sufficient to perform a physical examination.

When checking the mouth, care must be taken to not injure the animal in the process. The use of a sexing probe to gently open the mouth will be the easiest option. When observing the mouth, it is important to check the airway at the same time. The mouth must not have excess mucus or damaged teeth which may cause an abscess and there

must not be any audible sound coming from the airway. Colour of the mucus membrane is individual; it also depends on the temperature of the snake. If the snake is cold, the mucus membrane will have more of a blue tinge, transversely if the snake is warm the membrane will be pink in colour.

A close check of the scales is necessary to observe the health of the snake, a retained eye-cap from an incomplete slough for instance can cause great harm to the animal or retained scales on the tail may cause a 'ring-barked' effect resulting in the partial loss of the tail. Just like many other animals, a healthy looking coat is indicative of a healthy animal. Snake are no different, if there are patches of dull looking scales or roughed appearance; this is a good indication that something possibly may be wrong with the animal. If the snake is due to slough, this observation can be overlooked.

8.3 Routine Treatments

Worming and vitamin supplements such as 'Reptivite' and 'Calcivite' may be introduced.

8.4 Known Health Problems

Respiratory infections:

Infections are influenced by respiratory or systemic parasitism, environmental conditions such as low temperatures, unsanitary conditions, concurrent disease, malnutrition, and hypovitaminosis A.

Signs of this disease include - Open-mouth breathing, nasal discharge, drooling and difficulty in breathing. There is also a chance of the snake developing septicemia in severe or prolonged cases.

Treatment includes - Improving the husbandry of the animal and antibiotics in severe cases. Reptiles with respiratory infections should be maintained at the upper end of their preferred body temperatures as this stimulates the immune system. A humid environment may also assist in dislodging the mucus developing.

Scale Rot:

Humidity and environmental contamination has been considered to be the main factors in causing scale rot. Secondary infection by a number of other bacteria may result in septicemia followed by death if untreated.

Signs - Hemorrhaging into scales, followed by pustules that eventually lead to open and ulcerated lesions.

Treatment - Systemic antibiotics, topical antibiotic ointment, and good hygiene.



Pic 19: Severe case of Scale Rot in a Burmese Python.

Mouth rot:

Signs - It is noticed early by blood spots in the mouth and dead material develops along the dental arcade as the condition worsens. In severe cases, infection extends into the bony structures of the mouth. Respiratory or Gastro-intestinal infection may develop in poorly managed cases.

Treatment - Debridement, irrigation with antiseptics or antibiotics, and systemic antibiotics. In severe cases with ulceration or granuloma formation, more aggressive surgery may be necessary. Vitamin supplementation may be advantageous but it has not been proven.



Pic 20: Severe Mouth Rot in a Diamond Python.

Ecto-parasites:

Mites - Skin of affected snakes appears coarse. Affected reptiles often spend an excessive amount of time soaking to drown the mites. In heavy infestations, death due to anemia may occur. The mites are often found near the eye-caps and the vent.

Methods of treatment include; hygienic cages which are cleaned thoroughly, with substrate, branches, and disposable cage furniture sanitised with each clean. Newspaper or butchers paper should be used as substrate until treatment is completed to assist with frequent cleaning and to eliminate egg-laying sites.

Ivermectin is the treatment of choice for many keepers, the cage and reptile should be sprayed thoroughly every 4-5 days. The water dish should be removed while spraying and drying to prevent poisoning.



Pic 21, 22: Microscope image of a snake mite and appearance of a mite on an albino Boa.

Ticks - are frequently found on wild snakes, and heavy infestations may result in anaemia. These parasites can be removed manually. A small amount of ticks on a wild snake is a natural occurrence and the snake is not in any danger of suffering from a small infestation of ticks.



Pic 23, 24: Microscope image of a snake tick and appearance of ticks on a Carpet Python.

Ecto-parasite infestations are best prevented by thorough quarantine of all new animals entering a population.

Endo-parasites:

Every effort must be taken to rid reptiles of parasite burdens, and the environment of intermediate hosts.

Hookworm - resides in the upper Gastro-Intestinal tract and causes erosive lesions at the site of attachment.



Pic 25: Image of Hookworms removed from a python.

Roundworm - causes severe lesions and death may be seen in infected snakes. Infected snakes regurgitate partially digested food or adult nematodes and may appear anorexic. The lesions caused by this parasite in the Gastro-Intestinal tract may abscess and perforate the intestinal wall.



Pic 26: Image of Roundworms.

8.5 Quarantine Requirements

The snake must stay in quarantine for a minimum of three weeks or for as long as it takes to gain three consecutive clear faecal results.

Quarantine needs to be situated in locked room away from the general traffic of normal working hours. It must have its' own collection of tools and other necessities, such as; substrate, feeding utensils, bowls etc. All waste removed from quarantine must be wrapped up in plastic bags and placed in a quarantine specific bin.

9 Behaviour

9.1 Activity

Womas are a nocturnal species with most of their foraging time spent at late afternoon or early evening.

Womas display a behaviour which is not seen in other pythons. This is known as burrowing or digging. The snake will form its head into a 'J' shape and literally shovel the sand or substrate away from an obstacle such as a branch. I have seen this behaviour in an exhibit animal at Sydney Wildlife World and my personal snake. Both times the animals proceeded to construct a small hide area for itself.

9.2 Social Behaviour

Womas are a reclusive species who are also cannibalistic. They maintain little social interaction with other animals. The usual form of social grouping is at the time of mating where males will perform combat to gain the attentions and the right to breed with a female.

9.3 Reproductive Behaviour

Courtship displays – the male crawls over the female pressing his tail beside and under her tail and pulling his spurs back and forth into the side of the female's body in order to move her into an accessible position for mating. Copulation can last between 10 and 150 minutes (2.5 hours) and can occur one to many times over several days. Mating occurs naturally in May, June and July.

9.4 Bathing

This snake has not been witnessed bathing without the need of assistance for sloughing. For this need, every Woma in the collection must have access to an appropriate sized water container.

9.5 Behavioural Problems

There are no inherent behavioural problems readily noticeable in this snake. This is a very sedate python but incorrect husbandry or handling may result in behavioural problems. For example – the Woma is extremely food orientated so care should be taken to avoid feeding this python in its home enclosure. Snakes learn very quickly that when a door is opened there is a good chance of food being given and this trait may turn into misdirected aggression when the snake bites a hand or implement which enters its enclosure. To avoid this tendency, snakes should be fed in a separate enclosure or box which differs from its normal ‘home’ enclosure. This will teach the Woma that only when it is placed in this separate box that it will be fed and that food aggression is acceptable. This will also help to maintain the safe handling when the snake is removed from its ‘home’ enclosure.

9.6 Signs of Stress

When stressed, the Woma will appear agitated by either becoming very active and will move around the enclosure more than normal or appear aggressive, possibly attempting to strike at the handler. This aggression will include hissing.

9.7 Behavioural Enrichment

Enrichment Calendar:

1 Add sandpit for digging	2 Sunning	3 Browse change	4 Misting	5 Handling / conditioning	6 Add heated rock	7 Feed
8 Nil enrichment	9 Nil enrichment	10 Change / add hide	11 Add foliage	12 Add scent (rat / lizard / other slough)	13 Sunning	14 Add log
15 Feed	16 Nil enrichment	17 Nil enrichment	18 Misting	19 Browse change	20 Handling / conditioning	21 Rotate to a different enclosure

22 Change sandpit	23 Sunning	24 Change or add mulch	25 Change / add hide	26 Scenting (feathers)	27 Feed	28 Nil enrichment
29 Nil enrichment	30 Misting					

By providing various types of enrichment as shown above, the snake will become a better display animal due to the increased foraging and exploration time. This calendar is just an example; the calendar does not need to be followed strictly.

9.8 Introductions and Removals

Quarantine must be a minimum of three weeks with three clear faecal results before the snake can be introduced into the colony.

In captivity, the Woma should be housed separately due to its cannibalistic nature and the males' tendency to perform combat during the breeding season.

When intending on breeding, the male should be added to the females' enclosure soon after the cooling off period, if the mating doesn't occur within a week the male should be removed and returned after several days. By adding the male into the females' enclosure, you reduce the stress on the female by keeping her in a comfortable area and lower the chance of territorial aggression shown by either snake.

9.9 Intraspecific Compatibility

The Woma maintains an individual territory that it protects from others in its species it is generally compatible with other species in its territory, except those it chooses to hunt.

In terms of disease passage, other reptiles may pass pathogens and bacteria to the Woma these include various worm species and mites.

9.10 Interspecific Compatibility

As this snake has cannibalistic tendencies, it is not wise to house them together except for breeding times. If males are housed together, they will perform combat which may injure one or both males involved.

9.11 Suitability to Captivity

Womas adapt very well to captivity, and prove to be excellent education animals with their easy going nature and attractive appearance. They breed well in captivity with some institutions joining in repopulation programmes in various locations.

10 Breeding

10.1 Mating System

In captivity, the Woma is normally monogamous for ease on the keeper's behalf and studbook maintenance. In the wild, however, the Woma is generally polygamous.

10.2 Ease of Breeding

If the pair is compatible, breeding should commence several days after the introduction of the male.

General triggers pre-cursing breeding includes; winter cooling (generally around 10°C lower for around 3 months) and male combat.

10.3 Reproductive Condition

10.3.1 Females

Ovulation creates a noticeable swelling in the mid section of the body and the females will be generally more active.

10.3.2 Males

Males will actively search out the females but not have any noticeable difference in condition.

10.4 Techniques Used to Control Breeding

- Separation of sexes – as Womas are not a communal species, it is the easiest and most used technique to control breeding.
- Maintain temperature – by maintaining a consistent temperature year round in the enclosure, you reduce the chance of breeding as the snakes require a period of reduced activity and a cooling period (a decrease of about 10°C for approximately 3 months) to determine the correct time to breed.

10.5 Occurrence of Hybrids

Hybrids are rare, but they have been known to occur between Womas and their sister species the Black-headed Python (*Aspidites melanocephalus*). This is mostly in a captive situation; I am unaware of any cases of wild hybrids.

10.6 Timing of Breeding

Womas are seasonal breeders with mating occurring in May, June and July in the wild. In a captive situation, breeding may take place at any time of the year as long as the cooling period has been activated.

10.7 Age at First Breeding and Last Breeding

This python will generally mature at 3 years at which time it can begin breeding; pythons have been known to continue reproducing throughout their lives and into old age.

10.8 Ability to Breed Every Year

This snake has the ability to breed every year after reaching maturity.

10.9 Ability to Breed More than Once Per Year

Womas will only have a single clutch of eggs per year.

10.10 Nesting, Hollow or Other Requirements

- Wild – the female will find a secluded area or burrow to dig a small trench in which to lay her clutch.
- Captive – the female will become very reclusive in her hide box in which should be placed desert sand or damp newspaper for a nesting spot.

10.11 Breeding Diet

Both males and females fast over the autumn cooling period with the female not eating until after the incubation period.

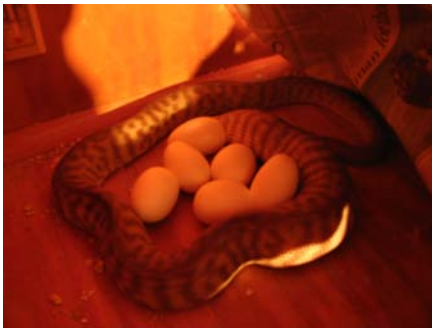
In captivity, the eggs are generally taken from the mother and artificially incubated. After a week without the eggs and a complete enclosure clean to remove all scent of the eggs, the female should resume eating.

10.12 Incubation Period

The incubation period for the Woma is on average 50 days.

10.13 Clutch Size

The clutches average 55% of the female's bodyweight. The average clutch size is around 14 but studies have shown that as the snake ages and grows the clutch size has the potential to grow as well.



Pic 27: Tanami laying a clutch of eggs. Photo by B. Walker.

10.14 Age at Weaning

As pythons are precocial there is no weaning age, the young snake will be completely self-sufficient from hatching.

10.15 Age of Removal from Parents

The eggs are normally removed from the mother soon after laying.

10.16 Growth and Development

Newly hatched snakes do not normally take food before their first slough which usually occurs several days to a week after hatching. The hatchlings grow exponentially with correct feeding.

11 Artificial Rearing

11.1 Incubator Type

An incubator is an apparatus for incubating eggs, where the temperature and the air humidity can be regulated (Kohler). There are several basic types of incubator used for reptile eggs; The Aquarium Method, Still-air Incubators, Forced-air Incubators and Modified and Combined Methods.

After researching the various methods of incubation, I personally feel that the Forced-air Incubators would be preferable for incubating the clutches of Woma eggs.

This incubator consists of several components; an inner and outer chamber (made from a material with strong insulating properties or insulated), a fan, a heating element, ventilation shafts, and a water tray to determine the level of humidity.

In this type of incubator utilizes a fan sucks air from the inner chamber, moving it over a heating element in the outer chamber before returning the heated air to the inner chamber through the ventilation shafts. This is advantageous as it allows very precise temperature control and as the air is circulated the temperature and humidity are steadily maintained within the inner chamber, so there is also little to no condensation within the inner chamber due to the division of inner and outer chambers.



Pic 28: Basic professional Forced-air Incubator.

11.2 Incubation Temperature and Humidity

The temperature of Woma eggs should be maintained at around 30-32°C and 70-80% humidity.

11.3 Desired % Egg Mass Loss

I am unaware of the desired % egg mass loss in Woma's but I would assume it to be around 10-15%.

11.4 Hatching Temperature and Humidity

If the eggs are maintained at 30-32°C with the humidity lowered to 60%, the hatchlings should pip and hatch comfortably.

11.5 Normal Pip to Hatch Interval

The hatching process may take up to a week from when the first egg is pipped to when the last hatchling emerges from the egg. The young snakes will often wait in the eggs for one or two days, after their head is seen outside the egg, before finally emerging (Kohler).



Pic 29, 30: Tanami locality pipping. Photo by B.Walker.

11.6 Diet and Feeding Routine

A hatchling will normally accept food after its first slough, before this time it has a store of egg yoke in its' stomach (Swan) which will sustain the young snake for several weeks. The first meal for a hatchling should be a size appropriate rat. A 'Pinkie' rat is usually appropriate for a hatchling Woma. The Pinkie is best fed either freshly euthanised or

freshly thawed and warmed to body temperature to increase the scent of the rat to encourage a quick feeding response.

Care has to be taken to prevent a fatty buildup in the snake, as this is a common problem when feeding mammals to a snake that naturally eats predominately lean reptiles. When the hatchling is still young, bi-weekly or weekly feeds is acceptable. As the snakes' size and age increase so should the size of the food product and the distance between feeds. I feed my two year old Tanami Woma only once every 4-6 weeks since he was 12 months old. His weight and condition has been maintained in a very healthy range.

11.7 Specific Requirements

Womas are generally voracious feeders and do not generally need any specific nutritional requirements. The mother should be given a calcium supplement injected into her first meal after laying the clutch to assist in reabsorbing the nutrients lost when producing the eggs.

11.8 Data Recording

Below is an outline of a basic record sheet for hatchlings.

Date	Description/Weight	Signature
3/11/08	Hatching weight 60g	S.G

Data should be recorded whenever there is interaction with the animal or any behavioural traits are noticed e.g. weighing, feeding, sloughing, medications given, time noticed foraging, handling, general temperament during handling.

This is an important task to undertake as it allows a record of all that has been done with the snake which will be needed to pass on if the snake is ever sold and is useful if the snake ever becomes sick as you can look back and see any predetermined symptoms.

11.9 Identification Methods

There are several valid methods which can be used to identify the individual snake.

These include;

- Microchips – This is good for a fail-safe method especially if there are many animals within the breeding program, but scanning each individual snake to find the one you need may be time consuming.
- Photographs – Photographs are the easiest method of identifying the individual animal in a quick and easy manner. If the photograph gets lost without a backup, this method can be unreliable.
- Descriptions – Written descriptions on the cage card is a fairly reliable method to identify the snake as long as on each subsequent cage card the snake is described the same way.
- Separate housing – Because the Woma is a reclusive and cannibalistic species, housing the hatchlings separately is a safe way to house them. This method of identification is useful but may cause problems due to Keeper error if the snakes are placed in the wrong enclosure.

11.10 Hygiene

All hatchlings should be kept in individual containers similar to ‘take-away’ containers.

This ensures ease of maintenance and hygiene standards.

This enclosure should be cleaned weekly following the SOP for cleaning enclosure in section 5.1. Care must be taken to dry the enclosure and implements before reintroducing the hatchling back to its enclosure.

11.11 Behavioural Considerations

There are no distinct behavioural considerations to be concerned with Womas.

11.12 Weaning

As pythons are precocial, there is no weaning period. The hatchling should accept its first meal readily after its first slough.

12 Acknowledgements

John Mostyn

Brad Walker

Jason Hainke

13 References

Jackson, S.M. (2002) *Standardizing captive-management manuals: guidelines for terrestrial vertebrates* revised, in *International Zoo Yearbook* (2003) 38: 229-243, The Zoological Society of London, London.

[www.bio.usyd.edu.au-Shinelab-publications](http://www.bio.usyd.edu.au/Shinelab-publications)

Keeping and Breeding Australian Snakes

Editor Mike Swan

AUSTRALIAN SNAKES - A NATURAL HISTORY

Richard Shine

ECOLOGY of REPTILES

Harold Heatwole and Janet Taylor

KEEPING AND BREEDING SNAKES

Chris Mattison.

www.multiscope.com/hotspot/herplyon/rbrood1.htm - Lyon Electric Company

RL1 Reptile Incubator

petcaregt.com/blog/cat-worm.html (photos)

www.examiner.com (photos)

www.boaconstrictor.de (photos)

www.vetafarm.com (photos)

www.ball-pythons.net (photos)

www.petclubuk.com (photos)

backlashreptiles.com/FEEDERS.html (photos)

www.snakeranch.com.au/index.cfm?action=woma_t... (photos)

s-tiger.photovillage.org/gallery/2363/Animals (photos)

<http://www.wildsideholidays.com/natural/images/stories/reptanfibs/snakes/snake-sketch-anal-plate-2.jpg> (photos)

<http://www.wildsideholidays.com/natural/reptiles-and-amphibians/313-identifying-snakes.html> (scale description)

Bibliography

Jackson, S.M. (2002) *Standardizing captive-management manuals: guidelines for terrestrial vertebrates* revised, in *International Zoo Yearbook* (2003) 38: 229-243, The Zoological Society of London, London.

14 Glossary

Adult rodent – rodent at full growth

Anal plate – single or split scale found at the cloaca

Bian marie – water bath used to heat rodents to body temperature

Dorsal – scales found on the back of the snake

Fuzzie rodent – rodent at first sign of fur growth

Monogamous – singer partner during the breeding season

Pinkie rodent – new born rodent

Polygamous – several partners during the breeding season

Ring-barked – process of several retained sheds around tail causing reduced blood flow and damage to the tail.

Slough – the process of removing dead skin to allow for the animals growth.

Sub-adult rodent – rodent which is older than a weaner but not full grown

Subcaudal scales – scales found on the tail of the snake, these are counted after the anal plate

Ventral scales – Scales found on the underside of the snake

Weaner rodent – rodent at weaning age

Appendix

F10 – MSDS

MATERIAL SAFETY DATA SHEET

COMPANY DETAILS MANUFACTURER:

AUSTRALIAN DISTRIBUTOR: Health and Hygiene (Pty) Ltd
COMPANY: Chemical Essentials (Pty) Ltd P O Box 347, Sunninghill 2157,
Address: 13 Abelia Str, Doncaster East, South Africa.
Victoria 3111 Tel:+27 11 474-1668
Emergency Telephone number:+03 9841 9901 Fax: +27 11 474-1670
Fax: +03 9841 9909 e-mail: info@healthandhygiene.co.za

IDENTIFICATION

PRODUCT NAME: **F10 SUPER CONCENTRATE DISINFECTANT** UN Number: None

D G Class: None

Hazchem code: None

Poisons Schedule: 5

**HAZARDOUS ACCORDING TO CRITERIA OF WORKSAFE AUSTRALIA IN THE PACK CONCENTRATE ONLY
(eyes and skin irritant)**

USE: Biodegradable multi purpose Disinfectant for all hard surfaces, equipment and airspaces

PHYSICAL DESCRIPTION/PROPERTIES

Appearance: Clear, colourless liquid, with a slight natural odour.

Boiling Point: 110°C

Vapour Pressure: Not known

Specific Gravity: 1.00

Flash Point: Not flammable

Flammability Limits: Not flammable

Solubility in water: Soluble

INGREDIENTS

CAS Number Quantity (w/w)

Benzalkonium Chloride 68424-85-1 5.4%

Biguanide 27083-27-8 0.4%

Ingredients not determined to be hazardous to 100%

HEALTH HAZARD INFORMATION

HEALTH EFFECTS:

Acute

SWALLOWED: Low. Substantial ingestion may cause irritation to mouth, throat and digestive tract.

EYE: Low. Will cause irritation but not serious damage.

SKIN: Low. Concentrate may act as mild degreasant to sensitive skin.

INHALED: Low. No significant hazard.

Chronic

INHALED: Low. No significant hazard

FIRST AID

SWALLOWED: DO NOT induce vomiting. Give milk or water to drink. Seek medical advice where necessary.

EYE: Rinse eyes with water. Seek medical advice where necessary.

SKIN: Wash affected area with soap and water.

INHALED: Non-toxic. Avoid long term inhalation of neat liquid. Remove to fresh air.

FIRST AID FACILITIES: Contact a doctor or Poison Information Centre (phone 131126)

ADVICE TO DOCTOR: Treat symptomatically

F10 SUPER CONCENTRATE DISINFECTANT

PRECAUTIONS FOR USE

EXPOSURE LIMITS: No data found

Engineering controls: None required

PERSONAL PROTECTION: Not required

FLAMMABILITY: Not Flammable

SAFE HANDLING INFORMATION

Storage and Transport: Store below 30°C in dry conditions

SPILLS AND DISPOSAL: Soak up on an inert material e.g. dry earth and dispose of in an area approved by local authority by-laws. Flush small spills with copious amounts of water

FIRE/EXPLOSION HAZARD: The product is not flammable or explosive.

OTHER INFORMATION: Ensure good industrial hygiene.

DO NOT mix with soaps or other chemicals.

CONTACT POINT: Managing Director, +03 9841 9901

Chemical Essentials Pty Ltd

KEEP OUT OF THE REACH OF CHILDREN

Issue number: 2

Issue Date: August 2004

Ivermectin

M A T E R I A L S A F E T Y D A T A S H E E T

SECTION 1. Product and Company Identification

Private Label Ivermectin

Product Code: F-IVERMECTIN-PL

Product Name: Private Label Ivermectin **Chemical Family:** Compound

Synonyms

Manufacturer Name and

Address:

Farnam Companies, Inc.

301 West Osborn Road

Phoenix, AZ. 85013

24 hour emergency
nu

Business hours

Marketing

Telephone

Numbers:

(602)285-1660

(602)285-1660

(602)285-1660

Dates:

Date Created:

05/15/2002

Revision: 05/15/2002

Printed: 07/26/2007

SECTION 2. Composition/Information on Ingredients

Private Label Ivermectin

Hazardous Components (Chemical Name)	CAS #	Concentration
1. Ivermectin Comp Bla	70161-11-4	0.1 -1.0 %
2. Ivermectin Comp Blb	70209-81-3	0.1 -1.0 %
3. Titanium dioxide {Titanium peroxide; Titanium (IV) oxide; Rutile; C.I. Pigment white 6}	13463-67-7	1.0 -2.0 %

	OSHA PEL	ACGIH TLV
1.	No data.	No data.
2.	No data.	No data.
3.	No data.	10 mg/m3

SECTION 3. Hazards Identification

Private Label Ivermectin

Emergency Overview

No data available.

Route(s) of Entry: Inhalation? No , Skin? Yes , Eyes? Yes , Ingestion? Yes

Potential Health Effects (Acute and Chronic)

No data available.

Carcinogenicity: NTP? No , IARC Monographs? No , OSHA Regulated? No

Carcinogenicity/Other Information

Ivermectin is not listed as a carcinogen with NTP, OSHA, or IARC. Titanium dioxide is listed with IARC as "not classifiable as human carcinogen".

Signs and Symptoms Of Exposure

None known

Medical Conditions Generally Aggravated By Exposure

None known

SECTION 4. First Aid Measures

Private Label Ivermectin

Emergency and First Aid Procedures

IF SWALLOWED: If accidental ingestion occurs, get medical attention immediately.

IF INHALED: N/A

IF IN EYES: Flush with plenty of water. Get medical attention if irritation occurs or persists.

IF ON SKIN: Wash contact area with soap and water. Remove contaminated clothing and wash before reuse. If irritation occurs or persists, get medical attention.

Note to Physician

No data available.

SECTION 5. Fire Fighting Measures

Private Label Ivermectin

Flash Pt: N.A. **Method Used:** No data.

Explosive Limits: LEL: NE UEL: NE

Extinguishing Media

Use water spray or all purpose dry chemical.

Fire Fighting Instructions

Fire fighters should wear self-contained breathing apparatus and full protective equipment.

Flammable Properties and Hazards

None known

Hazardous Combustion Products

No data available.

SECTION 6. Accidental Release Measures

Private Label Ivermectin

Steps To Be Taken In Case Material Is Released Or Spilled

Shovel spill into disposal containers. Rinse spill site with detergent and water. Use suitable protective gear.

SECTION 7. Handling and Storage

Private Label Ivermectin

Hazard Label Information:

nitrogen oxides None known

phosgene

Precautions To Be Taken in Handling

Store in cool dry place away from heat or sunlight. Refrain from smoking and eating when handling. Wash hands after use. Avoid contact with eyes.

Precautions To Be Taken in Storing

No data available.

Other Precautions

KEEP OUT OF REACH OF CHILDREN. Not for human use. Do not use in horses intended for food purposes.

SECTION 8. Exposure Controls/Personal Protection

Private Label Ivermectin

Respiratory Equipment (Specify Type)

none

Eye Protection

goggles

Protective Gloves

rubber

Other Protective Clothing

None needed except for manufacturing situations or large spills or product.

Engineering Controls (Ventilation etc.)

Local Exhaust: sufficient

Special:

Mechanical (Gen):

Other:

Work/Hygienic/Maintenance Practices

Wash hands before eating, smoking or using restroom.

SECTION 9. Physical and Chemical Properties

Private Label Ivermectin

Physical States: Gas , Liquid , Solid

Boiling Point: N.A.

Melting Point: N.A.

Specific Gravity (Water = 1): N.A.

Density: No data.

Vapor Pressure (vs. Air or mm Hg): N.A.

Vapor Density (vs. Air = 1): N.A.

Evaporation Rate (vs Butyl Acetate=1): N.A.

Solubility in Water: No data.**Solubility Notes**

Dispersible

Percent Volatile: N.A.
Saturated Vapor Concentration: No data.
Viscosity: No data.
pH: No data.

Appearance and Odor

White odorless paste

SECTION 10. Stability and Reactivity

Private Label Ivermectin

Stability: Unstable [] Stable [X]

Conditions To Avoid - Instability

NE

Incompatibility - Materials To Avoid

None known

Hazardous Decomposition Or Byproducts

None known

Hazardous Polymerization: Will occur [] Will not occur [X]

Conditions To Avoid - Hazardous Polymerization

None known

SECTION 11. Toxicological Information

Private Label Ivermectin

No data available.

SECTION 12. Ecological Information

Private Label Ivermectin

No data available.

SECTION 13. Disposal Considerations

Private Label Ivermectin

Waste Disposal Method

Dispose of according to local, state and federal regulations

SECTION 14. Transport Information

Private Label Ivermectin

DOT Proper Shipping Name

No data available.

Additional Transport Information

No data available.

SECTION 15. Regulatory Information

Private Label Ivermectin

No data available.

SECTION 16. Other Information

Private Label Ivermectin

The following information is for the Ivermectin only, not the Zimecterin Paste.

Ivermectin:

LD 50 Mouse, oral 25 mg/kg

LD 50 Rat, oral 50 mg/kg

LD 50 Dog, oral approx 80 mg/kg

The information and data herein are believed to be accurate and have been compiled from sources believed to be reliable. It is offered for your consideration, investigation and verification.

PERIOD	Indicate the period the licence is required (maximum period 1 month). A licence is issued for one consignment only during this period.				
	From Date (dd/mm/yyyy):		To Date (dd/mm/yyyy):		
SPECIES LIST	List of protected native animals to be imported or exported.				
	SPECIES COMMON NAME	SPECIES SCIENTIFIC NAME	NUMBER OF FAUNA	SPECIES CODE NUMBER	
EXPORT LICENCE APPLICATIONS	If you are applying for an export licence, you need to tell us where the animals originally came from				
	Name of Supplier	Licence Number	Receipt Number	Quantity	Date Supplied
PAYMENT DETAILS	Enter your payment details here if you are paying by credit card. You may also pay by cheque or money order (made payable to Department of Environment and Climate Change). The licence fee is \$20.00				
	<input type="checkbox"/> MasterCard	<input type="checkbox"/> Visa	Card expiry date:	Amount:	\$
	Card number				
	Name on card:				Card holder's signature:
DECLARATION	<ul style="list-style-type: none"> I hereby apply for a licence under section 128 of the <i>National Parks and Wildlife Act 1974</i> to import/export into/from NSW the protected native animals listed by me from/to the interstate person nominated above. I undertake to notify the authority, responsible for the protection of fauna at the place to which it is proposed to import/export the above protected fauna, in accordance with Clause 50(c) of the <i>National Parks and Wildlife Regulation, 2002</i> of details of protected fauna proposed to be imported/exported, and of the time of intended import/export, within 48 hours immediately preceding that time. I have not, within the period of 3 years immediately preceding the making of this application, been convicted of an offence against section 108 or 133 of the <i>National Parks and Wildlife Act, 1974</i>. I declare that all the information provided by me in this application is true and correct. 				
	Applicant signature:		Date:		
	Parent/guardian's signature (who is named above):				
<p>Allow fourteen (14) working days for the processing of your application. Note that incomplete applications will be returned</p>					

NSW Department of Environment and Climate Change, Locked Mail Bag 961, North Sydney, NSW 1585. Tel: 1300 087 263. Fax: 1500 087 263