Husbandry Guidelines for

HOG DEER

(Axis porcinus)
Hog deer

*Axis porcinus*

Cervidae

Compiler: Emma Blanch
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Western Sydney Institute of TAFE, Richmond
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Lecturers: Graeme Phipps, Jacki Salkeld & Brad Walker.
DISCLAIMER

This document is intended to be treated as a guideline and a ‘working progress’ in the care and husbandry of the Hog deer (*Axis porcinus*).

Therefore any incident resulting from the use of this document will not be recognised as the responsibility of the author. Please use at the participants discretion.
OCCUPATIONAL HEALTH AND SAFETY RISKS

Hog deer (*Axis porcinus*) are ungulates. The males grow antlers which can be very dangerous and cause considerable harm to both other deer/animals as well as keepers. Safety for keepers is critical. Keeper escape points in an enclosure are important in case deer get frightened and react accordingly. (Fright Flight Fight reactions).

Hog deer are extremely aggressive during rut. Therefore it is important to avoid handling, capturing or transporting them during this period. They need strong durable fencing of greater than 2 metres to prevent them from escaping and to keep predators out. (Acharjyo, 1988)

Enclosure barriers should have smooth surfaces and/or rounded corners for hog deer as these present a risk to such flighty animals. When handling hog deer, hessian can be used to cover their heads. This acts as a visual barrier for flighty deers, to make them feel more secure.

In order to create a safer environment for the deer, the keepers and veterinarians, it would be advisable to incorporate crushes in the deer’s enclosure for the purpose of capturing, handling, medical checks and injections/vaccinations and other routine procedures.

Using and following Standard Operating Procedures (SOPs) ensures keeper’s safety in the deer enclosure. It is important to follow all written procedures as well as following a two keeper system when attending to these deer.
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1. INTRODUCTION

Hog deer (*Axis porcinus*) is a member of the Cervidae family, they are found in the areas stretching from Pakistan, through northern India to mainland Southeast Asia. A population of the hog deer was introduced in a number of countries, including Australia, United States and Sri Lanka. The hog deer has been named after the manner in which it runs. While running, its head is hung low like a hog, which helps it in ducking obstacles in its way, rather than leaping over them. (Indian Wildlife, 2005)

Hog deer are a small animal, which reaches a shoulder height of approximately 60 cm. It is counted amongst the smallest deer of the world and is regarded as one of the most primitive of the deer species. It weighs between 20 to 30 kg with antlers reaching approximately 30-35 cm in length.

The Acclimatisation Society of Victoria, with the support of the Victorian government, introduced and established hog deer in Victoria during the 1860s. See Table 1 for countries from which the introduced hog deer originated from. During the 1950s and 1960s the hog deer sank to a dangerously low population level because of widespread use of 1080 poison to control rabbits, and loss of habitat from scrub clearance and drainage of wetlands. The population is now responding to rehabilitation measures taken by the combined efforts of hunters concerned for the future of this attractive little deer and the wildlife department. On Sunday Island, The Para Park Co-operative Game Reserve Limited has demonstrated how hog deer will respond to good management practices by building the island's deer population from a handful of animals to its present strong population.

Table 1.

**The Origin of Hog Deer Imported by the Acclimatisation Society Prior to Liberation**

<table>
<thead>
<tr>
<th>Date</th>
<th>Source</th>
<th>Country of Origin</th>
<th>Sex</th>
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<td>India</td>
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<td>Mar. 1862</td>
<td>Unknown</td>
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<td>Oct. 1862</td>
<td>E.Blythe</td>
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<td>June 1863</td>
<td>H.L.Butler</td>
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<td>Aug. 1863</td>
<td>R.Mullick</td>
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(Mayze & Moore, 1990)
Another group of hunting organisations, in co-operation with the Victorian Department of Conservation and Natural Resources, has rehabilitated deer numbers in the Blond Bay State Game Reserve to such an extent that regulated, balloted hunting is now used as a means to harvest the natural increase. A further study into management practices may result in the deer being actively managed wherever suitable habitat occurs on private land, and this should guarantee their existence into the foreseeable future. (Australian Deer Association, nd)

The hog deer is regarded as endangered with a Vertebrate Pest Committee (VPC) of S (serious threat) that is these animals may be introduced and/or should be kept only in collections approved by the relevant State/Territory authority as being primarily kept for (1) public display and education purposes, and/or for (2) genuine scientific research approved by the relevant State/Territory authority. (Vertebrate Pest Committee, 2007)

A draft management plan has been established by the Department of Sustainability and Environment Victorian Government for hog deer (Axis porcinus) in Victoria. (Department of Sustainability and Environment Victorian Government, 2008)

There are also many conservation measures in place for the hog Deer worldwide (See appendix 1)

### 1.1 ASMP CATEGORY

The hog Deer is within the Artiodactyl Tag and there is no regional Program, Specimen Management level is 3, being annual census only. The census of current and planned holdings for the region is published in the body of the annual ASMP Regional Census and Plan document. (ARAZPA, 2009).

### 1.2 IUCN CATEGORY

The hog deer is classified as endangered (EN) with a VPC of S (Serious threat) (ARAZPA, 2009)

### 1.3 EA CATEGORY N/A

Hog Deer are protected wildlife under the Wildlife Act 1975. The species is declared to be “game” by a Governor in Council Order published in the Government Gazette. Hog Deer can only be hunted during the prescribed open season and through balloted hunting. (Department of Sustainability and Environment Victorian Government, 2008)

### 1.4 NZ AND PNG CATEGOREIS AND LEGISLATION N/A
1.5 WILD POPULATION MANAGEMENT

The former Minister for Environment, the Honourable John Thwaites MP, requested that the Victorian Hunting Advisory Committee (HAC) develop a management strategy for hog Deer in Victoria. In August 2005, the HAC established a subcommittee (see Appendix 11) to develop a draft strategy according to the government’s approved Terms of Reference (see Appendix 12). The stakeholders involved in this wild population management plan are:

- Department of Sustainability and Environment
- Department of Primary Industries
- Parks Victoria
- Victorian Hunting Advisory Committee
- hunting organisations
- Private landowners

(Department of Sustainability and Environment Victorian Government, 2008)

Current management activities include:

- a one month open season in April
- a bag limit restricted to one stag and one hind per hunter per season
- a tagging system to minimise the incidence of illegally taken animals
- the mandatory presentation of harvested animals at established checking stations (data gathered at checking stations could be used to monitor and assist in the management of the species)
- balloted hunting on Blond Bay State Game Reserve and Boole Poole Peninsula
- hunter returns to monitor hunter success, effort and provide an observation index
- compliance, including hunter education and enforcement
- assisting Para Park (a cooperative game reserve) to achieve their hog Deer management goals. (Department of Sustainability and Environment Victorian Government, 2008)

1.6 SPECIES COORDINATOR - NOT AVAILABLE IN 2009 ASMP DOCUMENTS

1.7 STUDBOOK HOLDER - NOT AVAILABLE IN 2009 ASMP DOCUMENTS
2. TAXONOMY

2.1 NOMENCLATURE

Class: Mammalia
Order: Artiodactyla
Family: Cervidae
Genus: Axis
Species: A. Porcinus
Binomial name: Axis porcinus (Zimmermann 1780 cited Mayze & Moore, 1990)

2.2 SUBSPECIES

A.P. ANAMITICUS

A.P. PORCINUS

2.3 RECENT SYNONYMS

None.

2.4 OTHER COMMON NAMES

French: Cerf-cochon; German: Schweinshirsch; Spanish: Ciervo porcino

(Animal Encyclopedia, 2005)

3. NATURAL HISTORY

Deer are not indigenous to Australia. They were introduced into Australia during the nineteenth century under the acclimatization programs governing the introduction of exotic (non-native) species of animals and birds into Australia. Six species of deer were released at various locations. The animals dispersed and established wild populations at various locations across Australia, mostly depending upon their points of release into the wild. These animals formed the basis for the deer industry in Australia today. (Deer & Elk Information Network, 2003)

Moore (cited in Department of Sustainability and Environment Victorian Government, 2008) “suggests that the subspecies A. p. porcinus was introduced into Victoria during the late 1860s, initially from Sri Lanka, later from India, and subsequently released into the wild.”

Hog deer are the smallest of the six species of deer in Australia and although they are a close relative of the Chital, they bear little resemblance to them. They are similar in size to a sheep, they have a heavy squat frame. Their coat is an ochre-brown colour. The hog deer makes a whistling sound when alarmed. It has been named after the manner in which it runs. They have a habit of rushing through grass and running with its head hung low. This is similar to a hog's behaviour which helps it to manoeuvre under obstacles, rather than leaping over them like other deer do. (See Diagram 1.) They are a solitary cervidae and are among the most primitive of all the deer species and are not found in large herds.

(Maze & Moore, 1990)
3.1 Diagnostic features (Morphometrics)

3.1.1 Mass and Basic Body Measurements

The hog deer are low, stocky built animals with a muscular body and measure between 60-75cm at shoulder height. Their head and body length is 105-115cm. The tail length is 17-21cm and its upper parts are brown in colour, while the under parts are white. The hog deer can weight between 50-110kg. (Walker, 2005).

3.1.2 Sexual Dimorphism

This species exhibits sexual dimorphism in that the male mature stag stands at approximately 65cm at the shoulder and weighs approximately 45kg while the female hind stands at around 60cm and weigh approximately 35kg. The females are slightly smaller than males and lack antlers. (diagram 2) The males have noticeably thick muscular necks and their antlers have brow tines rising at an acute angle from the coronet (or burr) and the beam, ending in a two-tined fork. There are usually six tines on mature animals, however, additional tines may be common in older animals. The antlers of mature stags are generally 30-35 cm long. (diagram 3) (Department of Sustainability and Environment Victorian Government, 2008)
3.1.3 Distinguishing Features

Built as a creeper, the hog deer has relatively short legs with its body being lower in the front than the back. The face is short and wedge-shaped. They are brown with yellowish or reddish tinge and sometimes have a speckled appearance as some hairs have white tips. There is a darker band running down the spine. Fawns have distinctive white spotting at birth, however, this fades with age. (Diagram 4)

The hog deer is a tropical living species of deer with antlers, which are approximately 30-35 cm long, which can be cast and re-grown in any season of the year. (Altina wildlife Park, 2008)

Diagram 5. Illustrates a hog deer that has cast its antlers and diagram 6. A hog deer when antlers are re-growing at velvet antler phase.
3.2 DISTRIBUTION AND HABITAT.

Distribution
The hog deer is found in the areas stretching from Pakistan, through northern India, to mainland Southeast Asia. However, a population of the hog deer was introduced in a number of countries, including Australia, United States and Sri Lanka. Its range and numbers have fallen, because of over hunting and habitat loss. Most populations are now highly scattered and only small in number. The areas in which it prefers to live in are often suitable for human cultivation and settlement, and as the human population in the region has increased so the hog Deer has disappeared from many places.

Figure 1. Distribution of hog deer in its native range (Redrawn from Whitehead, 1993) from (Huffman, 2008)
The size of the Victorian population is unknown. It is estimated that between 1,500 - 2,500 animals are distributed in small, isolated populations occurring along the south-eastern coast of Victoria, from Cape Liptrap in the west, to Orbost in the east. The Victorian population appears, now, to be the only viable wild population occurring outside its native range. Known populations are found at: Wilson's Promontory and the off-shore islands of Corner Inlet; the Boole Poole Peninsula (including the Gippsland Lake Coastal Park); the shore of Lake Wellington (including Heart Morass, Clydebank, Dowds Morass and Lake Coleman State Game Reserves, Lake Reeve) and The Lakes National Park (Sperm Whale Head and Rotomah Island) (Appendix 13). (Department of Sustainability and Environment Victorian Government, 2008)

Habitat

Hog deer tend to inhabit areas with good levels of cover near rivers and marshlands. They can also be found in dense reed beds, thick riverside vegetation and close to swamps in woodlands. The hog rarely inhabits areas of very thick woodland and forest. This variation is usually associated with time of year and food distribution.

In its native range, the hog deer is associated with major river systems and their grassland floodplains. The deer are not generally found in hill country. As a result, the deer primarily inhabit grassland and riverine forests. In some parts of their native range the deer can be found in coastal areas. (Department of Sustainability and Environment, 2008)

In Victoria Australia, hog deer populations commonly inhabit coastal shrublands and tea-tree swamps, including Manna Gum, Coast Banksia woodlands and Leptospermum, Melaleuca and Acacia scrub. Freshwater marsh and wet grasslands provide the most favoured and important habitat types available, particularly those areas that provide escape cover and the necessary food resources. (Department of Sustainability and Environment, 2008)

3.3 Conservation Status

While hog deer are still present in substantial numbers in some parks throughout India and Nepal, threats to its existence continue due to human activities directly affecting parks or indirectly affecting park boundaries. (G. Moore, pers. comm. 2006).

Most significant activities negatively impacting on hog deer populations according to Qureshi (1995) are habitat destruction as a result of increased urbanization, agriculture and forestry. In addition unsustainable hunting and the establishment of plantations in grasslands outside protected areas are also stated as having an impact.

Formerly the hog deer population was more widespread, the range of the hog Deer included Bangladesh as well, but the species has probably disappeared from the Sundarbans and has not
been reported from the tea gardens of Sylet District since the 1970’s (Salter 1984). More detailed information on the worldwide distribution and conservation of hog deer is included in Appendix 1.

In India and Nepal, hog deer have benefited from conservation measures implemented for rhinoceros and Swamp Deer (Cervus duvauceli), as these species inhabit similar ecosystems. (Department of Sustainability and Environment, 2008)

Currently the hog deer (*Axis porcinus*) have no regional program however it is regarded as endangered (EN) in the 2009 International Union for Conservation of Nature (IUCN) with a Vertebrate pests committee (VPC) of S (Serious threat) and a management level of 3.

Evidence available indicates that the hog deer meets all the criteria for Endangered species and it is therefore considered to be facing a very high risk of extinction in the wild. (ARAZPA, 2009)

3.4 Longevity

3.4.1 Wild

Approximately 12-15 years (Mayze & Moore, 1990)

3.4.2 Captivity

Approximately 20 years (Michelin, 2008)

3.4.3 Techniques to determine the Age of Adults

1. Adult *A. porcinus* have pelage that is coarse and the overall coloration is a dark olive brown; however, the guard hairs have white tips. Fawns are born with a pale sandy-yellow color and with cream colored horizontally distributed spots along their flanks. At approximately six months this coloration gradually gives way to the adult coloration. Often, in the summer, the coat of an adult *A. porcinus* changes to reveal spots that are distributed such as those found on the fawn. The rhinarium (tip of the nose) is always naked and brown. One distinctive feature of *A. porcinus* is the unusually large round ears that are fringed with white hairs. Also, the tail is particularly bushy due to long hairs that lie in a dorso-ventral pattern. (Michelin, 2008)
4. HOUSING REQUIREMENTS

4.1 EXHIBIT/ENCLOSURE DESIGN

When designing an enclosure for the hog deer (*Axis porcinus*). The following need to be considered:

- That they have sufficient access to food and water to sustain health – grazing in paddocks or providing suitable and sufficient browse for them to eat
- The enclosure is designed in such a way to prevent predators from entering and harming the deer.
- Adequate fencing is provided, paying attention to height and type to prevent escapes and exclude predators.
- Management must avoid methods, which cause undue stress or which may cause nervous animals such as hog deer to collide with fences (Department of Primary Industries, 2008).
- Sufficient and suitable natural or constructed shelter as hog deer are forest/woodland animals they can become excessively nervous in enclosures without cover, and newborn fawns may succumb to heat or cold in open paddocks. (Deer Industry Association of Australia, 2008).
- If breeding hog deer make sure that there are sufficient hiding areas (shrubs or tussocks of grass) in which to have and hide their young.
- Facilities for hog deer should be constructed and maintained using building materials that does not include preservatives and paints which contain chemical compounds which may be harmful to the deer. Also constructions must be free of sharp edges and protrusions to prevent injury to deer and personnel. (Deer Industry Association of Australia, 2008)

4.2 HOLDING AREA DESIGN

The deer are maintained in captivity in spacious outdoor open enclosures or paddocks. These should be bound on all sides usually with a 2.0-2.5 meters high fence with chain-link mesh or partly with wet/dry moat on the viewers’ side and chain-link mesh fence/wall on the other sides. Alternatively, a wet/dry moat can form a barrier all around the enclosure. (Acharjyo, 1988)

Stand-of-barriers are provided on the viewers’ side to keep the visitors at bay. The important aspect for housing is that enclosure should be so designed to prevent the entry of stray dogs and other predators into the enclosure or to prevent the escape of the deer out of the enclosure.

The area of the enclosure depends upon the species and number of deer to be displayed. The Recognition of Zoo Rules (cited in Acharjyo 1988) stipulates-

- Minimum size of outdoor open enclosure for a pair of brow-antlered deer 1500m²
- Each additional deer allow an extra 125m²
- Minimum size of feeding/resting cubicle/night shelter 3.0 x 2.0 x 2.5 m
The enclosure may be established on a high ground to facilitate good drainage and should be away from carnivorous animals for stress less peaceful living. Sufficient number of trees, plants and bushes are desirable inside the enclosure to provide cover, shade, privacy and for rubbing of antlers. Wherever necessary tree guards may be provided to trees/plants to minimize damage due to nibbling and rubbing of antlers.

Enclosures need to have adequate and free access to water sources like ponds/water moats or water troughs. (Acharjyo, 1988)

4.3 Spatial Requirements -

**Holding yards:**

- Should be of appropriate size to comfortably accommodate deer and not expose them to injury
- Facilities for deer should be designed with due regard to the behavioural patterns of deer as a prerequisite for ease of handling and reducing risk of injury.
- There should be enough paddocks to permit animals of similar age, sex, size and compatibility to be grouped and to allow separation of incompatible groups where necessary at certain times of the year.
- Deer should be provided with sufficient space to move so that they do not suffer from overcrowding. Overcrowding of deer results in competition for food, water and space, which may lead to fighting and the risk of injury.
- All deer within groups should be free to stand or lie down comfortably at the same time.
- Aggressive behaviour is mainly a problem with male deer in the 'hard antler' cycle (Hard antler is when the antler of the deer is hard and sharp – extremely dangerous) Commercial farms should avoid carrying hard-antler deer. Avoid handling deer during the “rut” (normal period of hard antler) or use facilities that decrease the risk of injury from fighting.
- Deer require social interactions with members of their own species. Single animal should not be confined alone for more than the shortest period necessary.
- Fencing should be high enough to prevent escape and of a design which minimizes the risk of injury. Good fencing adequately maintained also minimizes the risk of predation.
- Gateways and passage ways should be free of internal projections which might cause injury and gates should have fastening devices to prevent escape.
- The provision of subdued light in the drafting pens and handling facility may reduce stress and assist the handling of deer. To avoid stress and risk of injury, deer should also be handled quietly so they do not panic and seek escape from a yard or other restraining facility. (Department of Primary Industries, 2008)
Handling facilities

- The facilities must allow for safe and easy handling of deer. Smooth solid barriers and walls in the races and handling shed will minimise injury and permit easy cleaning.
- Walls, ceilings, gateways, doors and crush must be free of sharp edges, projections or gaps likely to cause injury.
- The surface material within the handling facility should permit easy cleaning and disinfections.

Below is an example of a Proposed hog deer enclosure for Altina Wildlife Park:

![Proposed Hog Deer Enclosure](image)

(Altina Wildlife Park, 2008)

Area required for 15 hog deer is .4 ha (4000m²) Therefore area for each extra hog deer would be approximately 270m² (Altina Wildlife Park, 2008)

Fencing details for proposed hog deer enclosure

200mm x 3.6m fine strainer post accompanied by 200mm x 3.6m pine post at 6m intervals. Depth of post and strainers are 1.2m in the ground with each corner post supported between the two end posts with a 50mm medium steel pipe for corner support at a 2.1m height.

Deer fencing cyclone tite – grip: (19m high) with 2 x 3.15mm plain wires spaced 1.50mm above deer fencing height of fence 2.3m. (Altina Wildlife Park, 2008)

See attached appendices for other examples of Dear Holding designs. (Appendix 2)
The enclosure needs to be positioned where the deer are not exposed to extreme temperature, wind or rain. In Australia building an enclosure so that it faces North would ensure that part of the day there is shelter from the sun. Trees or man-made shelters could be provided so that they can escape from the extreme weather conditions if necessary. Shelters should be located so as to avoid adverse conditions such as seasonal flooding. (Canadian Agri-Food Research Council, 1996)

4.5 Weather protection

Like all grazing stock, deer need access to shelter and shade in hot and very cold weather and they need a dry place to lie down. Natural features such as gullies, hollows or trees can all provide shelter and shade, as can man-made features such as haystacks or buildings. The ‘hiding’ instinct is strongly developed in the deer and therefore access to places to hide their fawns. This is a behavioural requirement. Long grass areas could be planted for the deer to hide in. (Biosecurity, 2007)

4.6 Heating/temperature requirements

Artificial heating is generally not needed for hog deer. However, various forms of shelter (cover, trees, shrubs) from the elements and hay for warmth are required.

4.7 Substrate

The substrate should not be too soft for hoofed animals such as the deer. (Altina Wildlife Park, 2008). The deer would benefit from an abrasive such as cement to prevent abnormal overgrowth of hooves, which may necessitate surgical interference if overgrown. Where concrete surfaces are used a criss-cross cleat tread is recommended to minimise slippage.

Roofed handling areas shall have floors either of sand, sawdust or 100mm of concrete, laid to a fall of 1 in 60, on 150mm of well-compacted hardcore.

Floors in deer housing shall be concrete as above. Provision shall be made for the proper collection and disposal of wastes from housing, which shall normally be stored in a manure pit and the associated soiled water tank.

*To avoid the accumulation of faeces and urine in or on substrate around watering and feeding points:-

a) A readily cleanable or replaceable substrate must be provided around fixed watering/feeding points; or

b) The feeding/watering points must be easily moved.

For cleaning purposes floors should be non-slip and free draining. (Department of Agriculture, Fisheries and Food, 1991)
4.8 Nest boxes or bedding material

Hay or mulch are good bedding material that can be used however hay is preferred.

4.9 Enclosure furnishings

Enclosure furnishings, which should be included in a hog deer’s enclosure are:
- Naturalistic furniture such as logs, old branches
- Water and feed troughs
- Bedding material such as hay.
- Shelters, trees, bushes for protection against bad weather are needed.
- Planting of long grass, to lie and hide in, is recommended, especially for hiding their young.
- Enrichment hay or logs from other animal enclosures is also recommended as these stimulate the senses and facilitates the behaviour of rubbing their antlers.
- Rubbing posts or large tree stumps throughout the enclosure in order for them to have something to rub their antlers on.

5. General husbandry

5.1 Hygiene and cleaning

Maintenance of and proper sanitation and hygiene of the deer enclosures as well as the surrounding areas are of utmost importance for their health and well-being. According to Rebecca at Altina Wildlife park (one of three Parks in Australia) which house the hog deer, the following regime has been suggested for the care of the hog deer.

<table>
<thead>
<tr>
<th>How often</th>
<th>Task to be performed</th>
</tr>
</thead>
</table>
| Daily              | *Spot clean enclosure by picking up old hay (ensure no old hay which has possibly developed mould - replace with fresh hay  
|                    | *The excreta, left over food items, foreign materials like plastic carry bags should be collected daily and properly disposed off in appropriate places |
| Twice weekly       | Clean water troughs                                                                  |
| Weekly             | *Clean feed troughs  
|                    | *Changing of bedding material, soil or branches                                      |
| Monthly            | The pools and moats (both dry and wet) should be cleaned and disinfected regularly. |
| End of breeding season | *slash long grass in warmer humid weather so as to avoid breeding of lice/worms and therefore creating an infestation amongst the deer. |
| Annually           | As above                                                                            |
When cleaning a hog deer’s enclosure it is important not to use the chemical agent Bleach because of its corrosive nature and harmful fumes. See MSDS sheet (Appendix 3) Symbio Wildlife Park (2009) recommend the use of F10 SC Veterinary Disinfectant. It is available in 200ml, 1L, 5L and 25L sizes. See Appendix 10 for MSDS sheet

The benefits of the use of F10SC is that:-

- it has no adverse effects on humans or animals.
- it is biodegradeable
- kills bactericidal, virucidal, fungicidal, sporicidal and tuberculocidal pathogens
- cost effect- usage cost varies from 6c to 49c per diluted litre depending on concentration used
- non-corrosive, non-toxic, non-tainting, non-irritating,
- highly effective at low concentrations
- no rinse off required after use- just apply an leave to dry
- The F10 range is ideal for any animal/bird/reptile enclosure cleaning and disease control program.

(Chemicals Essential, 2009)

Chemical Control -- A limited selection of chemicals is available for use in controlling insect and mite pests of animals. Within this group, however, there is what can be used and various methods of application. Contact residuals, stomach poisons, fumigants, and repellents all have a place in this area of pest control. Possible methods of application include dipping, spraying, pour-ons or drenching, self-treatment and dusting, although many other methods are also available.

5.2 Record Keeping

Accurate and detailed records are necessary to effectively manage an animal collection and to provide the necessary information to attending veterinarians so they can determine accurate diagnoses, correct treatments and protective regimes. (Richmond TAFE, 2008)

It is important to establish a system whereby the health, condition and reproductive status of captive hog deer are routinely monitored and recorded.

Types of records that should be kept are:

- animal arrivals and acquisitions
- departures
- transfers within a collection
- births
- pedigrees
- deaths
- illnesses
- treatments
• routine procedures
• details of feedstuffs and diet
• weight/length/height
• personnel changes
• aggressive encounters
• injuries
• behavioural changes ie appetite, breeding

5.3 METHODS OF IDENTIFICATION

Preferred methods of identification used with deer are ear tagging, ear marking and ear tattooing. (Deer Industry Association of Australia, 2008)

Identification of individual hog deer can be made by visual appearance such as size, coat colour and pattern or distinctive body markings. Preferred methods of identification used with deer are ear tagging, ear marking and ear tattooing. (Deer Industry Association of Australia, 2008)

Each individual in captivity is also assigned an ARKS number. (Animal Record Keeping System) which is used to identify each individual via a computer databases worldwide.

5.4 ROUTINE DATA COLLECTION

Routine data collection is essential in producing working records of the history of a particular species. For instance records that may be required as part of a long term study of the growth and development of male and female hog deer would be:

• Measurement, weight of young at birth and at periodic intervals
• Recording correct diet between juvenile, adult, lactating and mature deers.
• Separating male and females to compare the difference in growth
• Recording breeding season and when the best time of the year is.
• Recording the amount of young each female hog deer has annually
• Recording interaction between individual deer.

6. FEEDING REQUIREMENTS

Deer have a typical ruminant digestive system requiring similar nutrient and Micronutrients to other ruminant animals such as cattle and sheep. (Department of Primary Industries Victorian Government, 2001)
6.1 WILD DIET

Deer are ruminant herbivores that feed nocturnally. They both graze and browse, but seem to prefer grazing. Typical foods include grasses, leaves, twigs, young shoots of edible trees and plants and occasionally fruit.


6.2 CAPTIVE DIET

According to Acharjyo of the Wildlife Institute of India “The deer in captivity are fed with concentrates in the form of mash (consisting of crushed grains like barley, oats and ragi (type of millet; crushed pulses like horse gram (type of legume) and Bengal gram, crushed oil cake, common salt and vitamin and mineral supplements) or dry cattle/ goat ration or pelleted cattle feed.” He also states that the concentrate formulae of deer mash of NZP (Desai and Malhotra, 1978) and of NKZP (Acharjyo pers. comm.) are as follows in Table 3:

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>NZP (Institution 1)</th>
<th>NKZP (Institution 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat Bran</td>
<td>22%</td>
<td>10%</td>
</tr>
<tr>
<td>Rice Bran (fine)</td>
<td>-</td>
<td>24%</td>
</tr>
<tr>
<td>Horse gram (whole/ crushed)</td>
<td>12%</td>
<td>25%</td>
</tr>
<tr>
<td>Maize (whole)</td>
<td>13%</td>
<td>-</td>
</tr>
<tr>
<td>Barley (crushed)</td>
<td>16%</td>
<td>-</td>
</tr>
<tr>
<td>Oats (crushed)</td>
<td>8%</td>
<td>-</td>
</tr>
<tr>
<td>Ragi (crushed)</td>
<td>-</td>
<td>20%</td>
</tr>
<tr>
<td>Groundnut Oil Cake (Crushed)</td>
<td>26%</td>
<td>19%</td>
</tr>
<tr>
<td>Turmeric Powder</td>
<td>1%</td>
<td>-</td>
</tr>
<tr>
<td>Salt</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Mineral mixture/ supplement</td>
<td>1%</td>
<td>0.980%</td>
</tr>
<tr>
<td>Vitamin AD3 supplement</td>
<td>-</td>
<td>0.020%</td>
</tr>
</tbody>
</table>
The daily ration for each adult hog deer at NKZP is 0.750 kg of concentrate deer mash in addition to grass and green fodder given ad lib.

The concentrates are fed in the morning plus seasonal fresh grass and green fodder in the afternoon. The quantity of food required by an individual is determined according to species, age, sex, size, weight and physiological status of the deer such as state of pregnancy and nursing status, young and growing animals.

Deer replacing antlers and pregnant does have high demand for minerals especially calcium. The ruminants need large amount of roughages to keep the gastrointestinal canal healthy, mobile and efficient. Lack of sufficient roughages may lead to stasis of bowel and telescoping of the intestine. (Acharjyo, 1988)

It has also been observed that depriving them of foraging time leads to abnormal behaviour like lip, neck and tongue movements, etc. The deer in captivity are group feeders. Therefore, they need to be provided with sufficient feeding space enabling them to have their full share of food and exercise. Inadequate and poor quality of food may give rise to nutritional stress manifested by deficiency diseases. These ruminants need large amount of roughages to keep the gastrointestinal canal healthy, mobile and efficient. Lack of sufficient roughages may lead to stasis of bowel and telescoping of the intestine. (Acharjyo, 1988)

According to Rebecca Altin (Altina Wildlife Park NSW, 2008) the hog deer require paddocks with adequate green feed, natural grasses/or irrigated pastures. Roughage such as hay (oat and vetch) to be given on a daily basis and salt mineral blocks also to be occasionally supplied. She also states that varieties of hay and grains are to be rotated on alternate days, limited quantities of bread can be offered for conditioning and grain can be given to these deer as a supplement. (See table 4 for recommended daily quantities)

**Daily Recommended Volume per deer given at Altina Wildlife Park**

<table>
<thead>
<tr>
<th>Type of Feed</th>
<th>Daily Quantity required per animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain chaff mix</td>
<td>½ litre container</td>
</tr>
<tr>
<td>Corn</td>
<td>½ litre container</td>
</tr>
<tr>
<td>oats</td>
<td>½ litre container</td>
</tr>
<tr>
<td>Clover hay</td>
<td>1 kg</td>
</tr>
<tr>
<td>Lucerne hay</td>
<td>1 kg</td>
</tr>
</tbody>
</table>
The following Table 5 shows plant species commonly used by Hog deer (*Axis porcinus*) in Australia.

Table 5.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanic Name</th>
<th>Height (metres)</th>
<th>Spread (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Blady grass or kunai</td>
<td><em>Imperata cylindrica</em></td>
<td>0.3 – 0.75m</td>
<td>0.3m</td>
</tr>
<tr>
<td>2. Kikuyu</td>
<td><em>Pennisitum clandestinum</em></td>
<td>0.3-0.4 m</td>
<td>2m</td>
</tr>
<tr>
<td>3. Bloody Crane’s-bill</td>
<td><em>Geranium sanguineum</em></td>
<td>0.2-0.3m</td>
<td>0.3m</td>
</tr>
<tr>
<td>4. Fairy Crassula</td>
<td><em>Crassula multicava</em></td>
<td>0.3-0.4 m</td>
<td>1m</td>
</tr>
<tr>
<td>5. Hairy Folage Lupin</td>
<td><em>Lupinus hartwegii</em></td>
<td>0.6-1m</td>
<td>0.5m</td>
</tr>
<tr>
<td>6. Running postman</td>
<td><em>Kennedia prostrata</em></td>
<td>0.2-0.4m</td>
<td>4m</td>
</tr>
<tr>
<td>7. Sea Rush</td>
<td><em>Juncus kraussii</em></td>
<td>0.8 – 1.2 m</td>
<td>0.7m</td>
</tr>
<tr>
<td>8. Common Rush or Tussock Rush</td>
<td><em>Juncus usitatus</em></td>
<td>0.4-0.6 m</td>
<td>1m</td>
</tr>
<tr>
<td>9. Round Leaved Sundew</td>
<td><em>Drosera rotundifolia</em></td>
<td>0.1-0.2 m</td>
<td>0.1m</td>
</tr>
<tr>
<td>10. Cape Sundew</td>
<td><em>Drosera capensis</em></td>
<td>0.2-0.3 m</td>
<td>0.15m</td>
</tr>
<tr>
<td>11. Swamp-weed</td>
<td><em>Selliera radicans</em></td>
<td>0.03-0.06m</td>
<td>1m</td>
</tr>
<tr>
<td>12. Hard-head Bushpea</td>
<td><em>Pultenaea capitellata</em></td>
<td>0.3-0.6m</td>
<td>1m</td>
</tr>
<tr>
<td>13. Saw Banksia or Old Man Banksia or Red Honey suckle</td>
<td><em>Banksia serrata</em></td>
<td>8-15m</td>
<td>8m</td>
</tr>
<tr>
<td>14. Guinea-flower</td>
<td><em>Hibbertia microphylla</em></td>
<td>0.4-0.6m</td>
<td>0.4m</td>
</tr>
<tr>
<td>15. Peppercorn tree</td>
<td><em>Schinus areira</em></td>
<td>8-15m</td>
<td>10m</td>
</tr>
<tr>
<td>16. Tea-tree</td>
<td><em>Leptospermum morrisonii</em></td>
<td>2.5-4m</td>
<td>4m</td>
</tr>
<tr>
<td>17. River She Oak or River Oak</td>
<td><em>Caswarina cunninghamii</em></td>
<td>25-30m</td>
<td>15m</td>
</tr>
<tr>
<td>18. Sydney Golden Wattle or Sallow Wattle</td>
<td><em>Acacia longifolia</em></td>
<td>4-5m</td>
<td>4m</td>
</tr>
<tr>
<td>19. Narrow-leaf Wattle</td>
<td><em>Acacia mucronata</em></td>
<td>2-4m</td>
<td>2m</td>
</tr>
<tr>
<td>20. Manna Gum or Ribbon Gum or</td>
<td><em>Eucalyptus viminalis</em></td>
<td>25-40m</td>
<td>10m</td>
</tr>
</tbody>
</table>
Important factors to consider when providing food to deer are:-

- The quality and quantity of the diet of farmed deer should be adequate to maintain health and vitality.
- The feed must meet the requirements of growth, pregnancy, lactation and cold stress appropriate to the species and environment.
- There is a substantial increase in energy requirements during the last trimester of pregnancy and early lactation.
- When group feeding ensure that all animals, and especially the sub-ordinate ones, obtain their fair share of feed.
- If the quality and/or quantity of pasture is limited and no supplements are being fed, the stocking rate must be reduced accordingly and the remaining animals monitored closely to ensure that they maintain satisfactory body condition.
- The appetite of deer may be depressed in winter and weight loss normally occurs during this period. Deer should be well fed in summer and autumn so that they are in good body condition by the end of autumn in preparation for winter.
- Deer should be protected as far as possible from toxic plants and foreign materials injurious to their health.
- Where deer are fed by-products, it is important to ensure that such products are wholesome, are nutritionally sound and do not contain any chemical residues or toxic material. These should be stored in sealed containers to avoid contamination.
- Under national legislation, products derived from, or containing mammalian tissue, may not be fed to ruminants.
- Changes to diet should be gradually introduced over several days. Sudden changes may cause digestive upsets, illness and even death.

(Department of Primary Industries Victorian Government, 2001)

6.3 SUPPLEMENTS

It is important to understand that supplements are not a complete feed, and must be given along with free access to adequate hay or native forage. A feeding program is only as effective as the management practices. Actual results can vary depending upon feed intake, environmental conditions and the quality of management practices. Deer should not have free access to corn as eating too much corn at one time can lead to serious digestive upsets and in extreme cases, even death.

It is important that all feed and supplements are stored in a dry, well-ventilated area free from rodents and insects. Never use moldy or insect-infested feed.
Examples of supplements, which can be obtained and given to hog deer are:

**Purina Mills Antler Max Deer Chow** - (See Appendix 7)
A 20%-protein pelleted ration designed to enhance the deer’s natural forage diet.

- Improves antler size and mass and improves body condition.
- Optimum reproductive performance and strong healthy fawns.
- Proprietary AntlerMax® Mineral - optimal antler growth, density and strength.
- Highly palatable - strong proprietary flavor attracts deer and elk.
- To be fed free-choice with adequate forage or quality hay.
- Feed from February through August.

(Atascosa Wildlife Supply, 2007)

**Purina Deer Chow Mineral** - (See Appendix 7)
A highly researched loose mineral with proprietary AntlerMax® Mineral Technology. This product is a power-packed nutritional package with ideal amounts and ratios of vitamins and minerals for superior antler density and strength, optimum reproductive performance and healthy calves and fawns.

(Atascosa Wildlife Supply, 2007)

**Purina Deer Chow AntlerMax Block** - (See Appendix 7)
An 20%-protein, highly-fortified, year-round supplemental feed block designed to enhance the deer’s natural forage diet without the need for a feeder. This highly palatable, 33-1/3 pound block is not a substitute for a free-choice pelleted feeding program. The high protein content with patented AntlerMax® Technology helps promote good antler growth in bucks, reproductive success and abundant milk production in does and healthy development in fawns. Contains proprietary AntlerMax® Mineral Technology, a power-packed nutritional package with ideal amounts and ratios of vitamins and minerals for superior antler density and strength, optimum reproductive performance and healthy fawns. (Atascosa Wildlife Supply, 2007)

**Antler King Trophy Mineral**
*Trophy deer mineral* contains 27 different antler building minerals, vitamins and additives. Trophy deer mineral also contains a special yeast culture which allows the deer to better utilize and easily absorb the minerals and vitamins. The result is more minerals into antler and body development. Trophy deer mineral is best used when poured on the ground near a deer trail. Greatest consumption is from February to September.
The use of mineral supplements has become popular among land managers in an effort to improve antler size on bucks and also to improve reproductive success and enhance growth rates.

The Trophy Rock Mineral Attractant is a mineral block loaded with nutrients that are irresistible to deer. It contains over 50 trace minerals that are beneficial to antler growth and the overall health of an animal. It contains sodium, calcium, potassium, sulfur, magnesium, iron, phosphorus, manganese, copper, zinc and more. These blocks will last longer than other attractants. Weight: 7.5kg Dimensions: 33cm Length x 24cm Width x 19cm Height. (See diagram 7) (Cabelas Inc., 2008)

![Diagram 7. Trophy Rock Mineral Attractant](Cabelas Inc., 2008)

### 6.4 PRESENTATION OF FOOD

Food can placed in a hanging food net on a branch of a tree or can be placed in troughs. Hay can be scattered on the ground and vegetables can be chopped up and put in a crate then scattered in enclosure for deer to feed on.

According to Rebecca Atlin (Altina Wildlife Park, 2008) as a form of enrichment, it is also a good idea to supply deer with hay from other animal’s enclosures as deer are very social and are attracted to smells of other animals.

Sometimes accidental ingestion of foreign bodies/ objects like nails, wire, plastics, rubber etc., toxic paints, insecticides and pesticides used inside zoo premises cause health hazards and has to be scrupulously guarded against.

Hygienic storage and daily inspection of all food items for quality and quantity before feeding, regular and timely distribution of fresh and nutritious food must be ensured to prevent diet related risks. Clean water from protected water supply system may be provided daily. Salt licks are always made available inside the enclosure to avoid mineral deficiency.
7. **HANDLING AND TRANSPORT**

7.1 **TIMING OF CAPTURE AND HANDLING**

Best time to handle and transport hog deer is very early in the morning or at night when cooler and when away from other deer. Reason is because they are very flighty and get frightened easily and they are particularly susceptible to heat stress. Deer often are calmer when handled under reduced lighting and in covered sheds, however, ensure the lighting is sufficient to allow handlers to work safely. It is also best not to try to capture, handle or transport deer during the rutting season. (Altina Wildlife Park, 2008)

**Handling deer in yards and facilities**

- Deer should be handled quietly and with care and patience.
- Familiarise deer with handling facilities and procedures from an early age.
- Large groups of deer should be broken into smaller groups of 10 to 15 or less for handling and entering the yards.
- Deer should be handled by a minimum number of people.
- **Ensure appropriate footwear with steel toe-caps is worn**
- Design the handling system so that large mature stags can move through without direct contact with the handlers. If possible provide body shields and safety helmets for those working with deer.
- Ensure walls in the handling area are solidly built, without sharp edges, projections or gaps.
- Floors of handling facilities should be free draining, provide good traction and be kept as clean and dry as possible.
- Handling facility floors, alleys and chutes should be hard surfaced, properly drained and scored or treated to prevent slipping.
- Deer should be able to see animals in neighbouring pens to reduce stress and handling difficulties.
- Important that trained keepers work in pairs or groups when handling deer.

(Dept of Primary Industries. NSW Govt, 2006)

7.2 **CATCHING BAGS OR NETTING**

There are a number of netting methods used to capture deer. The drop net method (diagram 14 & 15), the rocket net method (diagram 12 & 13) These nets are usually made of some form of nylon and vary in lengths, heights and mesh sizes. When deer are caught in netting it is important to rapidly immobilize them as they may struggle enough to break a limb or neck and also because they are susceptible to suffering from Capture Myopathy. It is important to cover their head with a cloth ensuring that the eyes are completely covered. One person can approach the deer and hold down its hindquarters while another secures the head/neck. Then immobilize
with an appropriate intramuscular injection. See section 7.3 Chemical restraint. (Department of Primary Industries. NSW Government, 2007)

**Clover Traps**

Clover traps consist of a metal frame with mesh netting attached on all sides and a door at one end. Shelled corn is placed behind the trip line to lure deer in. When the deer trips the line, the door closes behind them. These traps are set in the evening and checked early in the morning. All traps remain open and inoperable during the day. This form of trapping captures only one deer at a time. (See diagram 8 & 9)

(University of Wisconsin-Madison, 2008)

**Stephenson Box Trap**

Stephenson box traps are made of wood. While ours have a door at each end, they have been modified so that deer may only enter from one end. They are baited with shelled corn at the back of the trap behind the trip line. When the trap is tripped, the doors close and the trap is dark inside which reduces stress for the deer. Stephenson box traps are set in the evening and checked early in the morning. This form of trapping captures only one deer at a time. (See diagram 10 & 11)

(University of Wisconsin-Madison, 2008)
**Rocket Nets**
Rocket netting provides an advantage of catching up to four deer from the same social group at the same time. For this capture method, a 30' x 50' net is either packed in a wooden box or laid out in front of four posts. Four rockets are attached to the net and either mounted on the posts or the box. Researchers wait nearby in a blind and when deer are eating the bait in a safe position in front of the net, charges are fired and the net is launched over the deer. Rocket netting is done in the late afternoon to early evening. (See diagram 12 & 13)

![Diagram 12. Traditional rocket netting with posts](image)
(side view)
(University of Wisconsin-Madison, 2008)

![Diagram 13. Traditional rocket netting with posts](image)
(Front view)

**Drop Net**
Drop netting provides the advantage of catching 2-3 deer at a time. The net is hung over a bait pile and the net is launched by nearby researchers. Drop netting is done in the late afternoon to early evening. Net size: 6m x 6m or 9m x 9m. (See diagram 14 & 15)
Diagram 14. Drop net set for capture

Diagram 15. Drop nets provide the advantage of capturing in narrower areas

(University of Wisconsin-Madison, 2008)

7.3 CAPTURE AND RESTRAINT TECHNIQUES

 Hog deer are very flighty animals. The larger male with antlers may be dangerous. Therefore chemical restraints should be used. Darting is the preferred method of restraint used, as it is less stressful. Catching nets can be used but you must ensure other deer are not in same enclosure when capturing to avoid stress. Precaution must be taken with antlers in males especially when in rut.

Physical restraint
• Trapped feral deer will be very nervous and flighty and can inflict serious injuries with their legs if allowed to thrash around. Physical restraint should be kept to a minimum. • Particular care must be taken when handling deer with antlers in velvet as they are easily broken and can result in significant blood loss. • Dogs should not be used during handling as they cause severe stress to deer. • Zoonotic risks include salmonellosis and yersiniosis.

Deer caught in trap yard with race— It is important to move slowly and quietly when approaching deer, as they are extremely sensitive to unusual sound and movement.— Slowly and carefully move the animals into the race.— Using something to blindfold the deer will assist the deer to remain calm.

Deer caught in trap yard/cage trap without restraining facilities— Immobilise with an appropriate intramuscular injection using a blow pipe, pole syringe or dart gun.
**Deer caught in netting** – Rapid immobilisation is required for animals caught in nets as they may struggle forcibly enough to break a limb or neck. – Place a dark blanket or other cloth over the head of the deer ensuring that the eyes are completely covered. – One person approaches the animal and holds the hind quarters while another person secures the head/neck. – Immobilise with an appropriate intramuscular injection.

**Chemical restraint** Anaesthesia can be achieved by an intramuscular injection of the following:– Fentaz® – (combination of fentanyl citrate and azaperone);– Ketamine and xylazine;– Ketamine and detomidine;– Ketamine and medetomidine; or– Tiletamine and zolazepam and xylazine. Dose dependent sedation can be achieved by the use of xylazine or detomidine alone. Injection sites are the large muscle masses in the hind limbs or side of the neck. A handheld syringe can be used in a crush or race while projectile syringes are used on deer in yards. (Department of primary Industries. NSW. Government, 2007).

Mayze & Moore, (1990) also stated that to lessen stress in hog deer during transportation they would administer an intramuscular injection of 15-20mg of Haloperidol to it immediately after it has been crated. The dose rate is dependent on the size of the deer and its state of excitement at the time.

**Using tranquillisers**
Tranquillisers containing the active ingredient etorphine hydrochloride are highly toxic to humans. Only use them in cases of genuine veterinary intervention and in situations where it is essential to safely transport stags.

Do not use them for routine management purposes, eg moving stags from one part of a farm to another. In special cases where use of etorphine hydrochloride tranquillisers is justified, it should only be administered by properly trained staff who have been authorised by a qualified vet. Make sure an assistant who is fully trained in administering the antidote is at hand. Deer farmers who want to use etorphine hydrochloride tranquillisers for other reasons will have to justify their use in accordance with regulation 7 of the *Control of Substances Hazardous to Health (COSHH) Regulations.*

This justification will need to take account of husbandry regimes which do not rely on sedation, and also on the existence of less hazardous drugs. Administering drugs with hypodermic darts should only be carried out by individuals who hold the appropriate firearms certificate and Home Office permit for using a prohibited weapon. They will also need to be familiar with all aspects of using the equipment.

**Handling facilities**
(i) There is a wide range of suitable deer handling and restraining facilities in terms of design and layout. New entrants to deer farming should obtain advice from qualified advisers.
(ii) The facilities must allow for safe and easy handling of deer. Smooth solid barriers and walls in the races and handling shed will minimise injury.
(iii) Walls, gateways, doors and crush must be free of sharp edges, projections or gaps likely to cause injury.
Restraining devices and equipment
(i) Specialised devices and equipment are available for restraining deer.
(ii) Depending on the species of deer being farmed, crushes, cradles and other specialised
equipment may have to be custom made for the species. They must be kept in good
repair and regularly maintained.
(iii) Operators must be proficient in operating these devices and must ensure that they are
working well, before any animals are brought in to be restrained.

Handling adult male deer
(i) Adult stags must be considered as potentially dangerous and treated with respect at all
times. Their handling during rut should be avoided or kept to a minimum.
(ii) Hand-reared animals are particularly dangerous due to their lack of fear.
(iii) Keep male deer with antlers separate from those without antlers, especially during the rut.
(iv) Avoid yarding deer with “hard antler” with other deer. It is preferable to individually pen
them within confining facilities to avoid risk of injury to themselves, other deer and deer
handlers.

Deer restraint
The collecting area will need to have a properly designed deer crush. Design the pen so that
animals are easily encouraged to enter the crush. Both ‘drop floor’ crushes (see Figure 1) and
‘squeeze crates’ (with collapsing padded sides) are suitable. If possible the crush facilities ought
to be able to deal with all types of deer including mature stags with full antlers. The deer crush
needs to protect the stock handlers from being hurt and also allow good access to the deer. A
simple form of head restraint is recommended.

Deer Crush – Mechanical restraint
Commercially available crushes vary in their general type and style.

The older, more common, style is the drop floor crush. A drop floor crush is simply a ‘V’ or
‘Y’ section of race. Once an animal enters the crush the floor is dropped and the animal
remains suspended by its shoulders and pin bones with its feet off the floor. It is held in the
(crush by its own weight. The animals are released when one of the sides is moved away from
the other, gently lowering the animal to the floor.

Newer crushes are essentially a small race with hydraulically controlled, padded walls. Animals are restrained between the walls while the operator undertakes the management
practice on the animal and then it is released.

An advantage of drop floor crushes is their cost. An advantage of hydraulic crushes is their
ability to safely and effectively restrain animals of any size.

Irrespective of the crush chosen it should incorporate a set of electric scales for easy regular
weight measurement of all stock. (Deer Industry Association of Australia, 2009)
Weighing
Several scale systems are available for weighing deer, the main types being electronic or mechanical, either suspended or as a platform. Usually the scales are incorporated in the drop floor crush.

Techniques to restrain while examining
Deer handling activities involve close confinement or restraint to perform a number of management activities, including vaccination, anthelmintic application, weighing, ear tagging and collaring, recording female lactational status, antler removal, health testing, assisting births, and artificial insemination.

To handle deer with minimal stress to animals and operator, certain basic facilities are required: raceway entry system, receiving coral, covered shed and yard system, mechanical restraining device, drafting system, and load-out race.

The best method of restraining deer for blood sampling or other procedures is to use a drop floor or hydraulic crush. After deer are restrained in the crush blood samples can be collected by jugular venipuncture into evacuated glass tubes containing either dipotassium ethylene-diaminetetraacetic acid or no anticoagulant (Wilson and Pauli, 1984).

*Figure 1 Deer restraint: drop floor crush*
Mk IV

Drop floor deer crush.
Dimensions: 53" X 72" X 75"
Designed to accommodate bigger racks. Larger animals enter more smoothly.
(Texus Wildlife Services, 2005)

7.5 RELEASE

Best to release the hog deer early morning or late afternoon when the temperature is cooler as this particular deer is very susceptible to heat stress. See 7.1 (Timing of Capture and handling)

* Location for releasing should be away from obstacles and other deer as these hog deer are very flighty and could injure themselves.
* Injuries will be reduced if they are given the opportunity to walk quietly out of the vehicle.
* All deer should be given access to water when unloaded.
* There should be facilities at the destination for humane unloading or slaughter of animals that may be unable to walk off because of injury or exhaustion.
(Public Welfare Standards and Guidelines Land Transport of Livestock, 2008)
7.6 TRANSPORT REQUIREMENTS  (IATA REGULATIONS SEE APPENDIX 8)

7.6.1 Box Design

EXAMPLE:

Note: Large giraffes are not recommended for air transport. For animals that exceed an overall height of approximately 1.50 m (5 ft) see Container Requirement 2.

Suggested size of transportation crates for deer and antelope species.

<table>
<thead>
<tr>
<th>Species</th>
<th>Length</th>
<th>Breadth</th>
<th>Height</th>
<th>Adjustment for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hog deer (A. porcinus)</td>
<td>1.30</td>
<td>0.50</td>
<td>0.90</td>
<td>Antlers in males</td>
</tr>
</tbody>
</table>

Materials
The container should be made of wood or metal and rubber, burlap or canvas for padding and light reduction, if required.

Dimensions
The height and width of the container must allow the animal to stand erect with its head extended, even if horned. The size of the container must sufficiently restrict movement so that the animal cannot turn around and therefore trap or injure itself, nor have space to kick and damage the container.
Frame
Must be a minimum of 2.5cm solid wood or metal pats bolted and screwed

Sides
Suitable plywood material must closely line the frame to a level slightly above the animal’s eye over which there must be a louvered or slatted area for ventilation.

Floor
The base must be solid and leak-proof there must be either pegboard or slats bolted to the solid base to give a firm foothold. A droppings tray must be provided under the pegboard or slates

Roof
Must be slatted at a width that horns cannot become trapped between the slates. If padding is required, soft material such as shavings can be stuffed under the rubber, canvas or burlap.

Doors
Hinged or sliding entry and exit doors must be provided; they must be fastened in such a way that they cannot be opened as on the sides.

Ventilation
Ventilation slots with 2.5cm spacing between the slates or holes with a minimum diameter of 2.5cm must be present, above eye level, on all four sides and the roof of close boarded containers, slots and holes must be covered with a fine wire mesh that will not allow any part of the animal, including horns, to protrude. If the mesh is on the inside of the container all edges must be protected to prevent injury.

Spacer Bars/handles
Must be made to a depth of 2.5cm and formed from the framework of the container.

7.6.2 Furnishings
A bedding of straw, wood shavings or similar material to absorb moisture is recommended (farm to farm only).

7.6.3 Water and Food
Food and water containers must be provided with outside access from a hinged bolted flap that must be large enough for the entry of a large water dish and quantities of appropriate food such as grass, hay and roots.

Deer should only be given a small amount to eat and a moderate amount of drinking water prior to transport from one farm to another.
### 7.6.4 Animals per box

There should only be one hog deer per box unless traveling by road from farm to farm.

**It is advisable, as far as possible, to pen separately**

- Deer of different species
- Animals of different sizes
- Stags/hinds
- Hinds/does
- Bucks/does
- Young animals

### 7.6.5 Timing of transportation

It is not good farm management practice to hold or transport deer where climatic conditions may cause stress to the animals, so temperatures, time of day and anticipated duration of journey shall be of major consideration. If deer show signs of heat stress or dehydration (panting, dry mouth, reduced response to normal stimuli), they should be cooled with water and should not be transported until they have recovered.

**Transporting deer**

Laneways, which connect with the paddock, should be used to move the deer into the handling shed. The crush should have a drop away floor, and the top third of the side panels should fold down to give the handler easier access to the animal. The front and rear doors of the crush can be either sliding or hinged. The deer are usually transported in a covered deer trailer to maintain the animals’ under low light conditions to keep them calm and to make handling easier (SCA, 1991; Mackay, 1998). If there is a need to transport deer over a long distance, the preparation for transporting includes feeding them once during the night and again in the early morning. The deer can then be loaded into a covered deer trailer. For young calves or fawns, a roadside feed of warm reconstituted milk may be required, depending on the distance and time. The regular feeding of deer in holding yards close to the loading ramp will condition deer to yarding and reduce the stress on deer prior to transport. It is preferable, however, not to transport very young deer.

As a guide, for journeys over two hours duration, the minimum floor space allocated per adult male deer in transport crates should be:

- 0.3m² for Fallow and Chital deer (similar in size to hog deer)
- Female deer should be allocated at least 75% of the area required by males.
- Strains of deer with larger than average body weight may require more space.
- For transport of long duration (time exceeding 24 hours), allocated space should be increased accordingly (recommendation 20 % increase in
allocated space).

- Loading deer either too loosely or too tightly predisposes them to injury.
- Partitions should be used to reduce the likelihood of injury.
- The density of loading should be determined by the need to minimize injury yet still allow fallen deer to rise to their feet without assistance. There should be sufficient room to allow deer to lie down during transport.  

(Department of Primary Industry, 2008)

7.6.6 Release from Box same as 7.5

8. HEALTH REQUIREMENTS

Preventative medicine programs are essential for keeping (deer) in captivity, as it is always easier to prevent a disease than to attempt to diagnose and treat it. Preventative medicine programs should include regular faecal collection (for identification and treatment of internal and external parasites), weighting of the animal and blood collection if possible. Animal health begins with exhibit design, knowing the species, their habits and social needs and providing for them.  (Jolly 2003)

8.1 DAILY HEALTH CHECKS

One of the mandates of any captive rearing facility is to maintain the collection of wild animals in optimum health. It can only be achieved by good management practices coupled with health care/ disease control programmes. The deer in captivity suffer from variety of infectious and non-infectious diseases like sister domestic ruminants.

Regular health monitoring by trained deer keepers is an important role in disease prevention. Close daily observations of each (deer) by keepers are essential. Keepers are often able to detect slight changes in an animal that may be the only outward signs of illness. Observations of the deers physical state (condition of their coat) and appearance, any changes in behaviour and activity patterns, and whether or not it is eating, drinking, urinating and defecating normally should be made daily. Also if there are any discharges from natural orifices etc. Monitoring of daily food intake and regularly weighing (deer) are good health indicators. Any health concerns should be brought to the attention of the zoos’ veterinarian.  

(Acharjiyo, 1988)

8.2 DETAILED PHYSICAL EXAMINATION.

A variety of minor medical procedures can be carried out in a crush, these include: weighing, blood collection, injections, oral administration of drugs, microchipping, hoof work, rectal and vaginal examinations. Physical restraint in a crush can be enhanced by the use of sedatives and tranquilizers.  (Jolly 2003)
There must be a well-equipped Veterinary Hospital under the charge of specially qualified and experienced veterinarian to attend the sick deer and initiate prophylactic/curative measures to optimise health condition.

Zoos should be equipped with facilities for controlling the animals. They should also have required equipments such as blowpipes, capture g, drugs, chemicals and a pathological laboratory to carry out routine clinical tests and surgical equipments to conduct operations. (Acharjyo 1988)

8.2.1 Chemical Restraint – see 7.3

8.2.2 Physical Examination

Key things that are looked for to gauge the health of a deer population is:-

- monitoring individual body weights, fawn survival (as an indicator of doe and habitat health), and habitat use can all be used to gauge herd health. With that said, pay close attention to the health of deer harvested early in the season. Underweight deer (for their age) are good indicators of a potential problem. (Buckmanager.com, 2009)
- whether the deer is feeding and drinking well, general appearance and coat condition and faecal condition ie diarrhoea and if any unusual mucus discharges from orifices.

General Anaesthetic procedures in the deer species are:

Pre anaesthetic/sedation
The procedures of either anaesthetising or sedating deer are normally carried out without complications. However as with other animals there are risks which are greater in certain circumstances such as:
- in stressed animals,
- deer with full stomachs,
- high or low ambient temperatures,
- dusty yard conditions,
- lack of adequate ventilation,
- animals with liver or kidney disease,
- animals in poor condition,
- excessive numbers of deer anaesthetised/sedated at one time.

A combination of ketamine and xylazine can be used to induce anaesthesia in Axis deer. Furthermore, anesthetic effects can be reversed by administration of yohimbine. In addition a delayed hypersensitivity reaction to the drug Xylazine has been reported in deer. This causes a mortality rate of about 1 in 1000 animals treated with the drug. (Sontakke, Reddy, Umapathy, Shivaji. 2007)
Post anaesthetic/sedation
As with all anaesthetic procedures there is a need to closely monitor sedated deer for at least 48 hours post sedation. Any adverse reaction or delayed recovery should be reported to the veterinarian without delay. Factors which indicate that animals are still under the effects of an anaesthetic include:

• unsteadiness and uncoordinated gait,
• lolling of the tongue out of the side of the mouth,
• excessive saliva coming from the mouth,
• excessive periods of lying down,
• bloated appearance.
Deer will have fully recovered from the anaesthetic when they:
• are grazing normally,
• have recovered to the point where they have a normal gait,
• respond normally to external stimuli,
• are standing or sitting with the head above the level of the shoulder (unless grazing).

Post develveting
• All tourniquets must be removed from the pedicles at a time suggested by the veterinarian.
• The stags should be returned to a recovery paddock as soon as possible. This should have clean pasture and contain no creeks, drains, dams or other life threatening obstacles for a sedated animal.
• Stags should be regularly inspected to ensure they are sitting normally and are not horizontally recumbent
• Following anaesthetic stags should be made to stand up and move around at regular intervals in order to monitor the rate of recovery.
  (New Zealand Veterinary Association 2004)

8.3 Routine Treatments

Prevention of disease by nutritional management, testing, vaccination, drenching and dipping, is more important than treatment. Prevention of disease and parasitism is best achieved by the routine use of anthelmintics and avoidance of overstocking, as the incidence of disease often increases with high density stocking. (Food & Agriculture organization of United Nations, 1982)

Undrenched deer on farms have higher parasite burdens than wild deer. This problem can be overcome if proper drenching procedures are followed. In New Zealand deer are drenched with anthelmintics against stomach and lungworms from 12 weeks to 9 months old.
  (Food & Agriculture organization of United Nations, 1982)
**Worming**

Routine treatments are a major aspect of Zoo keeping because morbidity due to parasitic infestations has a great damaging effect on the well being of animals and when coupled with mortality especially in young deer could be devastating. Therefore, a de-worming schedule consisting of planned programme of examination of faecal samples to detect the parasitic infestation followed by administration of appropriate anthelmintics at regular intervals is necessary to lessen the incidence of parasite disease problems in deer. Also very important in the prevention of zoonosis. (Acharjyo, 1988)

Some products often used to treat deer are:

**Fasimex 100 Oral Flukicide** as a drench to treat immature and mature liver fluke. See MSDS sheets (Appendix 4).

**Genesis Pour On** for the control and treatment of internal and external parasites in deer. See MSDS sheets (Appendix 5)

**Cydectin Pour On** for the treatment and control of lungworm and roundworms in deer. See MSDS sheets (Appendix 6)

**Vaccinations**

Under the prevailing management practices, FMD Quadrivalent vaccine is being only given to a few sambar, chital and hog deer at very few captive rearing locations in India. No other vaccines are being administered to captive deer in India at present. But as a precautionary measure, domestic ruminants available around such locations should be given vaccine against common infectious diseases. (Acharjyo 1988) FMD Quadrivalent vaccine is used to prevent Foot and Mouth disease in Australia.

In Australia less than half deer farmers vaccinate their deer with 5 in 1 vaccine against clostridial diseases. As it is not expensive it is a good insurance if farmers are not sure of their farms history. (Deer Industry of Victoria, 2008)

Vaccination will never replace good management practices. However when faced with persistent disease vaccination may be an option. There is no commercial vaccine licensed for prevention of necrobacillosis in deer but variable results have been observed with Fusogard™ (Novartis). Fusogard™ is a pure *F. necrophorum* bacterin designed to prevent footrot and liver abscesses in cattle. Some deer producers claim to have achieved good protective results however its usefulness in deer species has never been scientifically established.

For prevention of Necrobacillosis in deer, animals are inoculated with a product made up from bacteria obtained from lesions on that farm, creating a more specific and effective immunity to the necrobacillosis organisms. Autogenous vaccines have been used to treat necrobacillosis in sick animals as well as prevent disease in healthy ones. Both uses have not been adequately tested in white-tailed deer and further investigation is needed to determine their usefulness. (Mikkelsen & Woodbury, 1999)
8.4 KNOWN HEALTH PROBLEMS

Johne's Disease

(J Clark, Grace and Drew, 2009)

Johne’s disease is a chronic, debilitating, infection of the intestinal tract. It occurs primarily in cattle, sheep and goats but can affect other ruminant species. Medical researchers have associated the presence of Johne's organisms in intestinal tract tissues with Crohn's disease in humans but have not shown the association to be causative.

Cause

Johne's Disease results from a bacterial infection of the intestine by *Mycobacterium avium*, subspecies *paratuberculosis*. This bacterium is also called simply *Mycobacterium paratuberculosis*, or *M. paratuberculosis*.

This disease is transmitted by animals eating anything that is infected with the disease ie milk from infected animals. Food or water contaminated with faeces from infected animals. Oral contact with contaminated surfaces such as udders or teats.

The *M. paratuberculosis* organism can live in faeces or standing water for months, and depending on the conditions perhaps more than a year.

Johne's disease organisms contaminate the pastures and environment of affected farms and persist for a long time. Uninfected animals placed into the contaminated environment soon become infected. (Woodbury, 2002)

Signs

In deer - weight loss, but sometimes with no diarrhoea but pasty faeces. In outbreak form can have severe, liquid, bloody diarrhoea and rapid death. The point is that the chronic watery diarrhoea usually seen in cattle may or not be present. Animals can maintain their appetite and appear normal except be losing condition because their damaged gut will not absorb nutrition.

In the intestine, the bacteria causes granulomatous inflammation. This type of inflammation thickens the intestinal wall, preventing it from functioning normally. This leads to diarrhoea and poor absorption of nutrients. As a result, even though animals will seem to be feeling and eating well, they will rapidly lose weight.
In deer abscess formation in body lymph nodes can occur. Outbreaks of Johne's with rapid progression of clinical signs to death have also been known to occur in young animals. (Woodbury, 2002)

**Treatment**

There is no effective treatment for Johne's disease (BJD). Animals showing clinical Johne's disease go on to die of malnutrition and other secondary disease, or are humanely killed and disposed of. BJD is endemic in Australia, although the disease is not common. BJD is a notifiable disease in all Australian states and territories. The disease can have serious economic effects, particularly in dairy cattle, due to production losses if it is not controlled. (Department of Agriculture, fisheries and forestry, 2007)

**Prevention**

Prevent new infections - Newborn animals must be protected from infection by being born and raised in a non contaminated environment, and fed colostrum and milk that is free of *M. paratuberculosis*. Except for hand-raised animals like orphans, this is easier said than done on an elk or deer farm. (Woodbury, 2002)

Adult animals carrying the *M. paratuberculosis* infection must be identified by laboratory tests and removed from the herd. In other words, test and cull.

**Necrobacillosis**

Necrobacillosis is also known as necrotic stomatitis, hepatic necrobacillosis, foot rot, calf diphtheria and lumpy jaw. It produces a variety of diseases, with abscessation occurring in almost any body organ or joint cavity. (Woodbury, 1999)

**Cause**

Necrobacillosis is caused by *Fusobacterium necrophorum*, an anaerobic, gram negative, often highly filamentous rod-like bacteria. This organism is found in the intestines of many species as part of the normal flora. It survives well in wet soil that has a high manure content. Other bacteria are often associated with the disease, *Arcanobacterium pyogenes* being the most common. (Woodbury, 1999)

**Signs**

The location in the body of lesions determine what signs are seen. Affected animals are usually depressed and have a fever. Often the hair coat is rough and the animal is thin and doing poorly. Lesions involving the mouth are often deep, invading the surrounding soft tissue and bone creating the classic swollen jaw or face. Animals may go off feed and begin to lose condition as the problem develops. In fawns the lack of nutritional reserve and toxic by-products of the infection lead to a more rapid death.

Lameness is seen when the feet and associated joints are involved. Swelling between the toes is the first sign seen, followed by localised tissue death, spreading to the joints and bones in more advanced cases.
In the throat, necrotic laryngitis will show itself as loud wheezing. Some dead tissue and bacteria may be sucked into the lungs causing abscess formation and pneumonia.

Cases of necrotic rumenitis or stomach abscesses frequently have few signs except weight loss in chronic forms or apparent sudden death. (Woodbury, 1999)

**Treatment**

Early detection of necrobacillosis is important if the disease is to be treated. The long-term results of treatment are not encouraging. Affected animals should be isolated from healthy animals. Feeding and drinking areas and working facilities should be cleaned and disinfected to prevent spread of the organism. Antibiotics are indicated for therapy. Although, like most drugs, they are not currently licensed for use in deer. Procaine penicillin is likely most effective with tetracyclines and sulfonamides being used as well. Where possible abscesses should be drained and flushed to remove debris and toxins. Debris and pus from the lesion should not be allowed to contaminate the treatment area. Collect and incinerate the material in a plastic bag. Amputation of a toe may be required in severe cases of foot rot where there is bone and joint involvement. A veterinarian should carry this out. (Woodbury, 1999)

**Prevention**

- Stress from overcrowding, social or hierarchy instability, inappropriate mixing of sexes and ages, or poor animal handling technique should be minimised.
- Good general hygiene should be practiced with attention paid to control of excessive fecal contamination of paddocks, holding and handling facilities, and feeding equipment. Hay offered on the ground will become contaminated with urine and faeces.
- **Do not** use preventative antibiotics without a diagnosis or good evidence of infection. In the long term, more problems will be created than will be prevented.

Food structure (coarseness) is probably not as important as the nutritional quality of food. Poor quality food decreases resistance to disease in general. There is some evidence that mucosal skin integrity depends on adequate vitamin A and C levels. Deficiency of these vitamins may predispose animals to necrobacillosis infection by making invasion easier. (Woodbury, 1999)

The type of soil underfoot may play a role in the persistence and transmission of *F. necrophorum*. Clay and other water retaining types of soil are thought to support bacterial life better than well-drained sandy soils (4). Whatever the soil type, avoid poorly drained paddocks and moist areas to raise deer. (Woodbury, 1999)
Bovine Tuberculosis

(Department of Natural Resources Michigan, 2007)

Tuberculosis (TB) is a serious disease caused when bacteria attack the respiratory system. There are three types of TB - human, avian, and bovine. Human TB is rarely transmitted to non-humans, avian TB is typically restricted to birds (pigs and occasionally other animals have been found to be susceptible), and bovine TB - or cattle TB - is the most infectious, capable of infecting most mammals. (Department of Natural Resources Michigan, 2007)

Cause

Bovine TB is caused by the bacterium *Mycobacterium bovis* (*M. bovis*) which is part of the *Mycobacterium tuberculosis* complex.

Signs

Bovine TB is usually a very slow disease to develop. Infected animals may not show any outward signs of illness, but many eventually exhibit weight loss and a gradual decline in general health. TB lesions may be found in any organ or body cavity of diseased animals. What signs an animal shows may depend on what organs are most affected. If the lungs are affected there may be a chronic intermittent cough and labored breathing. The lesions usually show up as tubercles (nodules or knobby swellings) which is how tuberculosis received its name.

In the early stages the lesions may be hard to find while in later stages they are easier to detect and often found in the lungs and lymph nodes in the chest, along the digestive tract, and within the head and upper neck. Lymph nodes are roundish bodies that help fight infection by supplying a type of white blood cell (lymphocytes) and filtering lymph fluid for disease. If one of these lymph nodes is near the surface of the body, such as around the head, it may show up as a firm swelling. (Manitoba Agriculture, Food and Rural Initiatives, 2009)

Small lesions in deer are not always readily recognized by hunters. Infected deer can have tan or yellow lumps on the inside surface of the rib cage and/or in and on the lung tissue.

Bovine TB infected deer not showing lesions in the chest cavity can be diagnosed by performing a visual inspection of the lymph nodes in the deer's head. Affected lymph nodes,
when cut, will contain one or more necrotic nodules. These nodules may vary in size and be filled with yellow-green or tan pus.

Tuberculosis is a chronic, progressive disease that can cause gradual debilitation, emaciation, depression, and intolerance to exercise. Coughing, nasal discharge, and difficulty breathing can result in cases where the lungs become severely affected. In some instances, superficial lymph nodes in the neck will develop large abscesses that may rupture and drain through the skin. (Department of Natural Resources Michigan, 2007)

**Treatment and Control**

There are **no effective vaccines for disease prevention** and **no effective medications for treatment** of bovine TB in wild deer. (Department of Natural Resources Michigan, 2007)

According to Faries & Davis (nd) Daily administration of antibiotics and antibacterials in the feed or water of confined deer can help prevent diseases for which no vaccines are available. In addition to these management practices, a vital part of Total Health Management is observing the captive deer daily for signs of diseases, dysfunctions, and inadequacies. Close observations of the deer’s appetite, body condition, attitude, behavior, mucous membranes, and body discharges are necessary to ensure their health.

**Prevention.**

Sick animals should be separated from healthy ones. If you have an animal that does not respond to routine treatments you should contact your veterinarian. If an animal dies it should be examined by a veterinarian if the cause is uncertain.

Steps should also be taken to decrease and eliminate the spread of TB between deer and elk and include: · Banning supplemental feeding of deer and elk including its use for recreational and hunting purposes · Maintaining adequate natural habitat for wild elk and deer · Maintaining wild elk and deer populations at levels that should limit spread when TB has been. (Manitoba Agriculture, Food and Rural Initiatives, 2009)

**Malignant catarrhal fever**

Malignant catarrhal fever is less common than it used to be, but is a severe disease. In deer it is associated with a herpes-type virus and probably comes from a form that affects sheep. Stags are more susceptible than hinds, and winter is the worst time for infection.

**Cause**

Malignant catarrhal fever is caused by several viruses in the genus *Rhadinovirus* of the family Herpesviridae family Herpesviridae (subfamily Gammaherpesvirinae). Caprine herpesvirus 2 (CpHV-2) is endemic in most domesticated goats and can cause MCF in cervids. (The Center for Food Security & Public Health, IOWA State University, 2008)
Signs
In deer, malignant catarrhal fever is usually acute or peracute, and the characteristic signs may not be seen. In one outbreak, all affected deer died within 1 to 2 days of the onset of symptoms. In other outbreaks, more typical MCF symptoms including corneal opacity, hemorrhagic diarrhoea and bloody urine are seen, and some animals survive for up to three weeks after the onset of disease. (The Center for Food Security & Public Health, IOWA State University, 2008)

Treatment
Cannot be treated and usually causes death.

Prevention
Malignant catarrhal fever can be prevented by separating deer from sheep, goats, wildebeest or other suspected reservoir hosts, feeding deer well and minimising their stress. (The Center for Food Security & Public Health, IOWA State University, 2008)

Internal Parasites such as Lungworm

Cause
Inadequate nutrition and feed being placed directly on the ground instead of troughs increases chances of contacting lungworm.

Signs
Signs of lungworm in deer are loss of condition, retarded growth rates and roughened coats. Consistent coughing and ill thrift are symptoms of infestations. (Food & Agriculture Organisation, 1982)

Treatment
Lungworm is treatable with drugs. Oxibendazole is commonly used as a prophylactic against these and other nematode infestations. (Wikipedia Free Encyclopedia, 2008)

“Pour-on” insecticides such as Genesis pour-on have been used for treatment in deer. Animals can be sprayed using garden spray equipment, providing that such equipment has not been used for other toxic chemicals such as weed killers. Little is known of the toxicity of insecticides for deer, so they should be used with care and not used on stressed animals. (Charleston, 1980)

Prevention
Build up of lungworms in deer can be prevented by regular drenching with common anthelmintics and removal of animals to clean pasture or captive animals being fed in troughs and not placing feed on the ground.
External Parasites

External parasites of deer include ticks and lice. Nymph (larval) ticks can be a major problem on newborn fawns, causing some deaths. Tick infestations of velvet antler during growth in the spring can be a problem in some years. (Clark, Grace & Drew, 2008)

Cause
The mobile stages of this pest climb onto foliage or structures like fences or buildings waiting for potential hosts to wander by. The larval ticks infest small animals, for several days, taking in blood until they are engorged and drop off. (FMC Corporation, 2008)

Signs
Signs may be actually seeing the ticks jumping and crawling on the deer’s coat. Tick dirt on skin or small scabs. Loss of fur.

Treatment
In treating a tick infestation, treatment time is critical as nymphs are most abundant from June to August. If ticks have already been found on the property, it is best to treat the entire yard with a spray to knock down the infestation and follow with long residual granule application to prevent reinfestation.

Apply TalstarOne™ multi-insecticide 0.59 Litres per acre to combat tick infestation. (FMC Corporation, 2008)

Prevention
Apply Talstar® PL granular insecticide or Talstar® EZ granular insecticide at 45.36 - 90.72 Kilograms per acre as a preventative.

There is also an insecticide worn as an ear tag, effective for up to eight weeks, has recently been developed for hinds during the fawning season where there is high risk of infection. (FMC Corporation, 2008)

8.5 Quarantine Requirements

Precautions to take during quarantine:

- Personal Protective Equipment (PPE) kept to the maximum
- Gloves to be worn at all times
- always wear a mask to avoid transferring disease (zoonosis)
- use foot bath to avoid transferring of disease
- isolation keeping animals away from other animals
- always disinfect food and water bowls before using with other animals

There should be a quarantine enclosure for housing all newly received deer for a period of thirty days and an isolation ward to accommodate the resident deer suffering from infectious diseases. (Acharjyo 1988)
Proper quarantine of newly arrived animals is an essential part of the preventative medicine program. Ideally the new (or leaving) deer should be housed separately from others and serviced by staff that will not have contact with resident animals for the quarantine period. (Jolly 2003)

Newly acquired stock should be isolated from other deer, treated if necessary, and not released with other deer until they all appear in a healthy condition. (Food & Agriculture organization of United Nations, 1982)

According to Jo Taylor (2009) from NSW Primary Industries Domestic Quarantine, currently no deer are allowed to be imported into Australia and therefore there is no documentation stating quarantine requirements. In NSW there are no specific quarantine requirements for deer except they are not allowed in the tick-protected zone, which is East of New England Highway and North of Dorrigo. This is a no deer zone. All deer must have a permit before being allowed to be transferred. Also if deer have been in a Bovine Johnes disease quarantine zone they are not allowed in the state at all. She also mentioned that when deer are being moved that their stock feed should also be checked as it may contain ticks. (Taylor, 2009)

When deer are being exported out of Australia the requirements differ depending on the country they are being exported to. See Appendix 9 for an example of requirements for exporting deer to Canada.

9. BEHAVIOUR

9.1 ACTIVITY

The times at which feeding and activity of hog deer occurs vary depending on the weather and the season of year. Warm to hot days the hog deer become active as early as 6.00 am, however if it is cold, there may not be much movement before 9.00am. If deer are undisturbed and the weather conditions favourable, they will feed further out into the open as the morning progresses, they have a tendency to alternate between resting and feeding periods. hog deer do not graze only in one area. Alternatively they will feed intermittently throughout the day and move from area to area with feeding peaks occurring immediately after dark and just before dawn. (Mayze & Moore, 1990, p108)

In general they prefer not to feed in open extreme heat and are not active during periods of heavy rain. This type of weather sends them undercover. (Mayze & Moore, 1990, p112-114)
Hog deer are normally thought to be a solitary species (Rowntree, 1935 cited in Mayze & Moore, 1990). However they have been observed in pairs or in small family units of 3-5 in habitats of dense vegetation and herds of 10-20 on short grass meadows. (Mayze & Moore, 1990, p165) See table 6 for hog Deer groups observed in Victoria.

<table>
<thead>
<tr>
<th>Location</th>
<th>Group size:</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>No. of Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday Island—Moore</td>
<td>38%</td>
<td>30%</td>
<td>13%</td>
<td>7%</td>
<td>12%</td>
<td>102</td>
</tr>
<tr>
<td>Sunday Island—Taylor</td>
<td>76%</td>
<td>17%</td>
<td>4%</td>
<td>2%</td>
<td>1%</td>
<td>278</td>
</tr>
<tr>
<td>Entire Study Area—Taylor</td>
<td>73%</td>
<td>18%</td>
<td>4%</td>
<td>2%</td>
<td>3%</td>
<td>507</td>
</tr>
</tbody>
</table>

Table 6: Size of hog Deer Groups Observed in Victoria (Mayze & Moore, 1990, p163)

Hog deer tend to congregate in larger numbers when feeding or during mating season in open pastures or freshly burned tall grasslands. This behaviour provides greater security. (Mayze & Moore, 1990, p171)

Generally hog deer according to Taylor (1973) display little obvious territorial or dominance hierarchal behaviour. Combative interactions occur but are rare. (Taylor, 1973 p79). However in captive enclosures as population density increases there has been evidence of increased aggressive encounters amongst stags (Mayze & Moore, 1990, p154)

When disturbed hog deer scatter independently in different directions unlike Fallow deer which follow a leader and run in line behind the leader (Mayze & Moore, 1990, p165)

Little aggression has been observed among female hog deer and if it occurs is mainly when they are close to calving or when they have young at foot. (Mayze & Moore, p160, 1990)
9.3 REPRODUCTIVE BEHAVIOUR

As the hog Deer does not have a distinct breeding season reproductive behaviour could occur throughout the year.

The reproductive behaviour of hog deer falls into three categories:-

1. Display (usually by males)
2. Searching for sexual contact (including fraying, scraping, flehmen, following and herding)
3. Direct sexual contact

1. Hog deer congregate in open areas to display to one another. The dominant male will court and then leave the area with a hind which is in oestrus.

2. The hog deer searches for sexual contact by:-

Fraying - this is where the stag vigorously rubs small shrubs or trees, breaking the stems and branches using its antlers.

Scraping - the hog deer scrap the ground with its forefoot then either it walks away or it may lay on scraped area for a short time before rising and moving back to a hind group again.

Flehmen - Flehmen is the action of a stag after smelling or tasting a hind’s urine. (The stag lifts his head with nose pointing upward at an angle of 45 degrees. The upper lip is curled back and the nose wrinkled.)

Following - The stag follows the hind usually prior to hind coming into oestrus to try to sniff and lick her genital area. This may occur a number of times before acceptance by the hind.

Herding - This may happen when the hind is close to oestrus but still not ready to accept the stag. The stag’s actions are more aggressive and chasing is vigorous in order to get close to lick the hind.

3. Courting and copulation – this occurs when the hind allows the close approach of the stag to lick or prod her genital area with his nose. The stag will lick the hind’s coat around the hip area and the stag then attempts to place his chin across her back or rump. Mounting is attempted, but often the hind will walk out from under him only to stop nearby, mounting attempts are continued and when the hind is ready to stand, copulation takes place. (Mayze & Moore, p173, 1990)
According to Staple (2009) there has been no evidence of hog deer bathing in either water or dust. They have however been seen to squirt urine twice on a spot and then lie down in it. This is reminiscent of the wallowing of advanced deer in urine soaked wallows (Geist, p69, 1998).

9.5 BEHAVIOURAL PROBLEMS

Deer become very stressed and fatigued during capture and are susceptible to shock after capture. When deer get stressed they rapidly dehydrate (McLellan, nd) and can develop various health problems such as bradycardia, anoxaemia, hypoglycemia and capture-myopathy leading to collapse and death. (Chowdhury, nd).

Hog deer stags are very aggressive during rutting season and as they have hard antlers at this time when fighting’ it is not uncommon for them to be injured or killed. (Staple, 2009) This is also a time to avoid handling or transporting of hog deer stages as the danger to the handler is severely increased.

9.6 SIGNS OF STRESS

The hog Deer is a very panicky and flighty animal, when stressed, frightened or disturbed, it will frantically run in all directions to escape. The hog deer becomes very dehydrated when stressed. (Mayze & Moore, 1990, p225). Capture myopathy can be a result of the hog deer being stressed if attempts are made to capture them using poor capture and handling methods.

9.7 BEHAVIOURAL ENRICHMENT

Behavioural enrichment is important in order to enhance the well being of captive animals. (Young, 1998) It is important for animals to be stimulated by replicating their natural environment and habits and therefore prevent boredom and stress.

Some examples of behavioural enrichment are:-

- Growing long grass or shrubs in enclosure in order for hog deer to hide or drop their new borns.
- Make available scratching posts or toys
- Providing hanging feeder crates filled with hay, containing holes to access hay
- Providing browse (bamboo)
- Providing hay to lie on
- Provide different scents (of other deer and species) rubbed on trees
- Provide some form of canopy for shelter from heat and cold windy weather eg trees shrubs or man-made structures.
- Provide logs for ducking under or leaping over.
9.8 INTRODUCTIONS AND REMOVALS

Prior to introduction or removing any hog Deer they should be quarantined or isolated for a period of thirty days. (Acharjyo 1988) The newly acquired stock should be isolated from other deer, treated if necessary, and not released with other deer until they all appear in a healthy condition. (Food & Agriculture organization of United States, 1982)

- Best time to remove or introduce hog deer is at night when cooler and when away from other deer. Deer often are calmer when handled under reduced lighting and in covered sheds or making use of blindfolds.
- Should avoid handling the hog deer when it is in rut and hard antler as it is very dangerous to other deer and handlers.
- Large groups of deer should be broken into smaller groups of 10 to 15 or less for handling and entering the yards.
- Deer should be handled by a minimum number of people.
- Deer should be able to see animals in neighbouring pens to reduce stress and handling difficulties (when being introduced).
- Location for releasing should be away from obstacles and other deer as hog deer are Very flighty and could injure themselves. (Department of Primary Industries. NSW Government, 2006)

9.9 INTRASPECIFIC COMPATIBILITY

Hog deer are not territorial animals and they do not live in large groups although numbers of them may frequently be seen feeding on favoured areas. After feeding, however, they disperse and bed down singly or in very small groups. If disturbed, they select individual escape routes. (Australian Deer Association, nd)

Males in these species generally are found alone and, though feeding associations of a dozen or so occur, the only stable group is a female and her offspring (up to 1 or even 2 years of age). (Groves & Bishop, 1989)

It is important that if you are housing stags in hard antler to avoid housing them in adjoining enclosures or if you do, you must have a good stock fence which also has low dense cover planted along it. This prevents the stags from seeing each other and therefore wanting to fight and possibly damaging the fence to get to each other. (Mayze & Moore, 1990, p256)

9.10 INTERSPECIFIC COMPATIBILITY

Hog deer are successfully keep in mixed species with Sika, fallow and swamp deer according to (Avent, 2008). They have also been successfully bred with other species such as the Chital deer (Staple, 2009) and Sika deer (McCullough & Takatsuki, 2009)
According to Staple (2009) the hog deer can be housed with macropods or other species but they tend to stick together within the confinement away from the other animals. If attempting to increase the hog deer population it would be better to house them separately.

9.11 SUITABILITY TO CAPTIVITY

The study of hog deer on Sunday Island by Mayze & Moore, (p257, 1990) indicates that the Hog deer do well in captivity in suitable conditions.

In Australia the hog deer has been held and bred successfully in captivity in at least three research projects, in private collections and on several commercial deer farms in New South Wales, Victoria, South Australia and Western Australia. (Mayze & Moore, 1990, p255).

10. BREEDING

10.1 MATING SYSTEM

The hog deer is **polygynous** - having more than one female as a mate at one time (Michelin 2002). Hog Deer stags will visit the groups of hinds, copulating with those in oestrus then departing. (Groves & Bishop, 1989)

10.2 EASE OF BREEDING

The hog deer is a very productive species and in an enclosed population where there are favourable conditions, the hind comes into oestrus very shortly after parturition (giving birth). If she is joined by a male with viable sperm, she will conceive again almost immediately. (Mayze & Moore, 1990, p182)

Hog Deer are good breeders and are capable of producing at least 3 fawns in 2 years. They are also capable of producing twins. (Staple, 2009)

10.3 REPRODUCTIVE CONDITION

Three factors which govern hog deer breeding activity are the age at which a hind becomes sexually mature, the previous calving date of the individual hind and the libido and sperm producing status of the males in the population.

10.3.1 **Females**

Age at sexual or reproductive maturity is on average 10 months. The weight of the hind also appears to be an important factor to when a hind might conceive Mayze & Moore (1990) state that between 21 – 25kg is the critical weight for the hind.
Figure 1: The influence of Critical Weight on Conception in hog deer. Data obtained from hunting season kills and research or management culls under special permit on Sunday Island. (Mayze & Moore, p186, 1990)

10.3.2 Males
Age at sexual or reproductive maturity is on average 10 months. (Michelin 2002) Successful mating is likely to take place only after stags achieve hard antler status. Stags are more active when in final stages of antler development and more so immediately after cleaning of velvet from their antlers. (Mayze & Moore, p191-192, 1990)

10.4 TECHNIQUES USED TO CONTROL BREEDING

Methods used to control breeding in hog deer are:

Separation- separating of male and females to avoid breeding or if attempting to create hybrids this could be controlled by introducing the stag of the other species ie Chital to the female hog deer in order for mating. (Staple, 2009)

Cropping or culling - In order to maintain the hog deer’s population equilibrium that is sex ratio of 1 male to 1 female, allowing the removal of approximately equal numbers of each sex during the hunting season. Or if the hog deer has increased considerable in numbers an increase in the number allowed to be hunted in that particular area during the hunting season. (Mayze & Moore, p299&304, 1990)
10.5 OCCURRENCE OF HYBRIDS

According to Staple, (2009) the hog deer and the Chital deer have successfully been bred to create a hybrid both in Australia and overseas.

The hog deer and the Chital deer have been known to hybridize and cross so well that they had to be separated. (Mayze & Moore, p384, 1990)

The hog deer has also been bred with the Sika deer in order to try and improve antler size and increase velvet production on farms. (McCullough & Takatsuki, 2009)

10.6 TIMING OF BREEDING

In the hog deer’s native range, there is no defined breeding season and birthing occurs in most months of the year. However, in the temperate climate of Victoria, there are peaks between July and September, so that calves can take advantage of a flush of spring plant growth. (Department of Sustainability and Environment, 2008)

![Figure 2: A seasonal comparison of births in Captive hog deer in three different localities. (Mayze & Moore, p181, 1990)](image)

Birth of young is spread throughout the year. hog deer males are capable of mating throughout the periods when in hard antler and possibly when in late stages of velvet antler growth. It is thought that testosterone level rises at time velvet is stripped also stimulating libido and production of sperm (Mayze & Moore, 1990, p173)

10.7 AGE AT FIRST BREEDING AND LAST BREEDING

According to Staple (2009) the hog deer start breeding between 9-16 months. There is no information of age of last breeding. However on Sunday Island several hinds in excess of 10 years were found to be pregnant. (Mayze & Moore, p185, 1990)
10.8 **ABILITY TO BREED EVERY YEAR**

The hog deer is capable of breeding every year. Females may breed after their first year and can produce 1.2 to 1.4 young per year. (Department of Sustainability and Environment, 2008)

10.9 **ABILITY TO BREED MORE THAN ONCE PER YEAR**

Hog deer do not have a specific breeding season. Hinds are not restricted to any definite period of oestrus and stags are fertile when in hard antler and also when they are in late stages of velvet. Therefore they are able to produce more than once a year.

The average interval between calving of hinds on Sunday Island was 283 days (Mayze & Moore, 1990, p182) therefore indicating that the hog deer have the ability to breed more than once per year.

10.10 **NESTING, HOLLOW OR OTHER REQUIREMENTS**

The hog deer require an area of tall grasses, dense reed beds or grass thickets where newly born fawns can be dropped and where they remain concealed from predators for several days.

10.11 **BREEDING DIET**

During the breeding season there is a substantial increase in energy requirements during the last trimester of pregnancy and early lactation. (Department of Primary Industries Victorian Government, 2001) Therefore increased feed should be provided to ensure growth in young deer, and to meet the nutritional demands of pregnancy and lactation in females. Department of Primary Industries and Water, 2008

Pregnant does also have high demand for minerals especially calcium, therefore it is important to ensure that they receive this supplement. (Acharjyo, 1988)

10.12 **OESTRUS CYCLE AND GESTATION PERIOD**

According to Mayze & Moore (1990) several observations indicated that hog deer hinds were in oestrus for at least 15-20 hours. However Mayze & Moore also state that the hog deer hinds are polyoestrus and that if not successfully fertilized on the first occasion enter a further oestrus cycle. Whether the oestrus cycles continue when the stags are in velvet antler is not known. Hog deer do not have a specific breeding season. Hinds are not restricted to any definite period of oestrus. (Australian Deer Association, nd). According to Mayze & Moore (1990) the gestation period for the hog deer is approximately 225-240 days.
10.13 LITTER SIZE

Hog deer are capable of producing 1-2 fawns at a time. Twinning is not uncommon with the hog deer. The young are also precocial which means they are well-developed when born. (Michelin, 2002).

The foetal sex ratio of hog deer is in the vicinity of 1:1 one male to one female (Mayze & Moore, p285, 1990).

10.14 AGE AT WEANING

Weaning occurs after three or four months. (Department of Sustainability and Environment, 2008)

![Figure 3. Age Class Mortality in hog deer as observed on Sunday Island (Mayze & Moore, p198, 1990)](image)

In the wild, predation is a major cause of mortality and therefore the above figures would differ if taken in the wild.

10.15 AGE OF REMOVAL FROM PARENTS

When a hind is about to give birth to a calf, the hind will drive other offspring away but as her calf grows, she is sometimes rejoined by her previous hind calf until the hind calf reaches calving age herself. Young stags, however, usually do not continue to associate with its dam and new calf. If a hind’s young stag offspring approaches her while feeding a new calf she will make an aggressive rush at and attempt to bite him. (Mayze & Moore, 1990, p188)
Hog deer calves on average weigh approximately 2.4 kg. They have a distinctive white spotting when born which fades with age. (Department of Sustainability and Environment, 2008) The hog deer both male and female have a rapid growth rate until they reach the age of two. As shown in figure 4.

Figure 4. Growth rate of hog deer. (Mayze & Moore, 1990, p 21)

Under normal conditions pedicle growth in hog deer stags commences between 7-8 months of age. These grow and are completed and hard in 80 days (Mayze and Moore, p24-25, 1990)

The following graphs (5,6,7 & 8) illustrate the various weight and linear measurements of hog Deer at various stages of development.

Figure 5

Figure 6
Growth of hog deer calves: height at shoulder, Male born Nov. 1968, Female born Nov. 1969, (Taylor, p51, 1973)

Figure 7.

Figure 8. Growth of hog deer calves: hind foot length, Male born November, 1968, Female born November 1969. (Taylor, p53, 1973)

11. ARTIFICIAL REARING OF DEER

11.1 HOUSING

Young Deer should be housed in:

- a suitably sized sturdy wooden box initially. This would depend on the size of the young deer
- Within a room or pen, provide a corner within which the fawn can shelter out of sight.
- Preferably should be an adjacent enclosed yard or run.
- For the older fawn/calf, a fenced area with a wind-proof shelter should be provided.
- Provide some warmth for the first one to two weeks
- A dry, clean floor is required with hay or hay-over-straw on the floor.
- Ensure the substrate provides a secure footing: e.g. carpeting for a young fawn in a box.
- Change bedding regularly, before it becomes noticeably fouled. (Bourne, 2009)
Newborns of all species have little ability to generate their own heat and very little insulation to prevent its loss. As a result, a deer born outside in cool, wet weather will quickly go into shock if it is not dried immediately after birth. Orphans are often chilled (hypothermic) and wet. Since the dam normally dries her newborn within an hour of birth, abandoned or orphaned newborns should immediately be dried and provided with supplemental heat. To do this, place the deer in a warm room and rub briskly with a dry towel. Direct, radiant heat, such as a heat lamp, is an excellent method of providing supplemental heat to a hypothermic newborn.

To be of benefit, a heat lamp must be placed the correct distance from the newborn. This distance will depend on the wattage of the heat lamp. If it is set too close to an immobile newborn, severe burns can result. If too far away, then the animal does not receive adequate warmth. To determine the proper distance, rest your hand on the deer directly under the center of the lamp for 4-5 minutes. There should be no discomfort. Continue testing the heat until the deer becomes mobile.

It is best to focus the heat over the chest. A dry towel can be placed over the newborn to help retain body heat, but towels and blankets may also stress the newborn. Towels can retain moisture and act as heat sinks, so they may actually impede recovery if not checked and replaced regularly. Constantly replacing shifted towels can cause the newborn unneeded anxiety.

Once revived, young deer can be very active. They can, and invariably do, knock over unsecured heat lamps and IV stands, so it is necessary to make sure that all lamps and cords are secured safely. It is important to permit the deer to move away from the heat lamp once it regains its normal body temperature. At this stage, a young deer will often determine its own comfort zone and will usually lie at the edge of the heated area.

(Miller, 2003)

**11.3 DIET AND FEEDING ROUTINE**

If a fawn has not suckled its mother it will need 4-5 feds of 100-200 ml of colostrum in the first 24 hours after birth. This colostrum can be supplied in one of two forms. Either it can be collected from ewes during the lambing period and stored in 300 ml lots in a freezer or each year 100 ml of whole blood can be collected from an adult deer and left to clot over 12-24 hours. This should yield 40 ml of serum (the clear liquid containing the all important antibodies), which can be frozen until needed. When required the colostrum or serum should be thawed without heating and can then be used to make up an artificial feed consisting of:

- one beaten egg
- 5 ml cod liver oil or medicinal paraffin oil
- 10 ml glucose
- 740 ml milk
- 40 ml blood serum of 300 ml of ewe colostrums
(Department of Primary Industries, Parks, Water and Environment, 2009)

The next hurdle in the course of hand-raising deer is feeding them. The composition of deer milks varies considerably from that of other domestic species. Deer milks contain 19-26% dry matter, 6-11% fat, 6-10% protein, 3-5% sugar and 1.1-2% ash. (Bourne, 2009)

Several formulae of milk are available but it is important to recognize that regardless which formula is selected, cow's milk by itself is generally inappropriate for young deer. Goat's milk, on the other hand, also seems to be an excellent substitute for deer milk. It should also be noted that while the overall balance of protein, fat, lactose and water is very important, the exact composition of the mixture is less critical than the care and attention the newborn receives.

**Procedure for feeding fawns milk/milk substitutes**

- Make up powdered milk with freshly boiled, cooled water.
- Feed milk warm (37°C).
- Nurse with the calf/fawn in a standing position.
- Hold bottle at 45 degrees, gently holding calf's muzzle around the teat with the other hand. Also young deer tend to prefer the old-fashioned rubber nipples as opposed to the new silicone ones. (Miller, 2003)
- Lean over calf to simulate doe's body if it pulls away. (See Diagram 16)
- Simultaneous massage of rump and anal area may be important.
- Restraint should be avoided if possible, but may be required for some individuals.
- If a young deer appears lethargic and is unwilling to drink, it may be suffering from dehydration, hypothermia, low blood glucose and/or a host of other maladies. At this stage it is useful to prepare oral electrolyte solutions, with additional glucose. These solutions can be administered directly by stomach tube. Every 30 to 60 minutes, 50-70 ml should be administered, until the newborn brightens and begins to eat on its own. It is best not to mix these preparations with milk. However, if a young deer has diarrhoea it may be useful to alternate feeding milk one time and electrolytes the next. If using a milk replacer, diluting the concentration may also solve the problem. (Miller, 2003)
Diagram 16. Fawn being hand-reared and bottle fed formula (Mayze & Moore, 1990)

**BOTTLE FEEDING SCHEDULE  Table 7.**

<table>
<thead>
<tr>
<th>Age</th>
<th>Feeding sessions/day</th>
<th>Quantity in grams/day</th>
<th>Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st week</td>
<td>every 4-5 hrs around the clock</td>
<td>300-600 increasing daily</td>
<td>milk *</td>
</tr>
<tr>
<td>2nd week</td>
<td>6-7</td>
<td>800-1200</td>
<td>add grasses, water, soil#</td>
</tr>
<tr>
<td>3rd-5th week</td>
<td>4-5</td>
<td>1,000-1,500 at room temperature</td>
<td></td>
</tr>
<tr>
<td>6th-7th week</td>
<td>2-3</td>
<td>1,500</td>
<td></td>
</tr>
<tr>
<td>8th-9th week</td>
<td>1</td>
<td>Ad lib</td>
<td></td>
</tr>
<tr>
<td>10th thru 14th week</td>
<td></td>
<td>Wean, turn out with herd</td>
<td></td>
</tr>
</tbody>
</table>

*Remember to massage intestine and rectum; watch out for diarrhoea!*

#Faeces should resemble adults (dark, hard, holds shape), also harden off fawns at this time. (Miller, 2003)

Hardening off is one of the last steps in hand raising young deer. This is accomplished by equalizing the temperature of the rearing area with the ambient temperature for about two weeks before releasing the deer. Before releasing hand-reared deer back to the herd, faecal samples should be taken at 2-4 weeks of age to determine if there are any parasitic infections. (Miller, 2003).
11.4 SPECIFIC REQUIREMENTS

It is important not to move young until absolutely sure they have been abandoned as:-

- Deer fawns/calves are commonly left unattended for long periods of time, particularly in the first weeks of life. If a fawn which has been found and inappropriately "rescued" is returned to its original location as soon as possible (less than 24 hours) there is a good chance the mother will return for it. It should be observed discreetly from a distance to avoid scaring the mother and interfering with her returning and taken for rearing only if its mother fails to return or if it shows signs of ill health or injury. (Bourne, 2009)

- Pick up the young deer with gloved (latex) hands or a clean sheet, towel or blanket. This minimizes bacterial exposure and the transfer of human scent if the newborn is to be returned to the mother. (Miller, 2003)

- Remember to massage intestine and rectum after feeding milk; watch out for diarrhoea! This mimics the maternal stimulation of urination and defecation. (Miller, 2003)

- Deer with young at foot under 4 weeks of age should not be transported however young can be transported separately from does for short trips. However an initial period of warmth, quiet and darkness is required when transporting young deer as they are extremely flighty and very susceptible to capture myopathy. (Deer Industry Association of Australia, 2008)

11.5 DATA RECORDING

It is important to record and maintain routine records daily. Such records provide an objective means of assessing progress and provide useful data for improving rearing methods.

The following data should be included in records of each hand-reared individual:

- **Weight:**
  - Weigh daily, at same time each day in order to monitor weight gain accurately.
  - Scales must be of an accuracy appropriate to the body weight of the animal.
  - It may be useful to weight the animal before and after feeding to determine the actual weight of food taken.
  - If the infant's weight is not increasing or weight loss is occurring, consider the quantity of food being consumed, whether the animal is suffering from diarrhoea, or if there is an infection present.

- **Feeding:** keep individual records of:
  - All fluids given
  - Milk replacer used.
  - Any dilution.
  - Addition of e.g. vitamins, minerals.
- Quantity of milk taken.
- Number of feeds per day (note time at each feed).

- **Urination/defecation:**
  - Produced spontaneously?
  - Produced in response to toileting?
  - Changes in colour/consistency of faeces.

- **Weaning:**
  - Age first solid foods taken.
  - Preferred initial food items.
  - Age of weaning.

(Bourne, 2009)

### 11.6 Identification Methods

Preferred methods of identification used with deer are ear tagging, ear marking and ear tattooing. (Deer Industry Association of Australia, 2008)

Tagging of deer can take place at any age, the earlier the better, as recording the weight, birth date, and other information may be beneficial later when the mothering up process takes place. Colour coding or using left/right ears to identify males from females is also helpful later. (Miller, 2003)

### 11.7 Hygiene

Hygiene is vital at this stage. It is important to realise that milk or milk replacers are excellent media for the growth of bacteria. For this reason, strict cleaning procedures must be followed to prevent disease. Milk replacers should be prepared as needed, not made in advance.

The rearing area must be kept strictly sanitised while raising deer. Bedding that is wet or soiled with urine, faeces and spilled feed will become a breeding ground for disease-producing organisms. The area where orphaned deer are reared should be well ventilated but warm and free of drafts. A light source mimicking daylight hours, or direct sunlight, is important to produce the essential vitamin D. Also, the area should be secure from predators. Smooth and solid walls will help prevent injury. The floors should be well supplied with clean, dry, dust free straw. Never use sawdust, as inhalation is a problem. Rearing areas should provide at least one square meter per housed fawn/calf. (Miller, 2003)

When hand rearing deer it is important to:

- Keep feeding bottles and equipment clean and store in a sterilising solution such as Milton (Found in most department stores or chemists).
- Mimic maternal stimulation of defecation and urination by massaging the rump and perineum with a damp sponge or tissue at least two times per day until the young deer should develop control of these functions by two to three weeks of age.
• Provide good quality pasture and palatable grain concentrates from two weeks of age; wean from six to eight weeks.
• Ensure fresh, clean water is available at all times.
• Understand that young deer can deteriorate and die quickly if weaning signs are ignored or a Vet is not consulted immediately. (Miller, 2003)
• Wipe milk off face with warm damp sponge after each feed, particularly if feeding from a bucket, to avoid hair loss due to "milk scald". (Bourne, 2009)

11.8 BEHAVIOURAL CONSIDERATIONS

• **Imprinting** is an issue with fawns as they soon become accustomed to the feeding routine and imprint on the feeder. It is considered better to under-feed than to over-feed. Do not give in to cries for additional feedings if not warranted. (Miller, 2003)
• If a fawn gets too attached or imprints with feeder they can fret when that person is not around and they may stop feeding and get sick.
• Never bottle-feed a buck without first understanding the risks!!! They can be aggressive, especially toward those with whom they have imprinted, since they have lost most of their natural instinct to fear humans. No deer in hard antler can be trusted. (Miller, 2003)
• Continual close contact with humans will create a significant degree of bonding. This loss of fear of humans translates into a loss of respect for humans, bucks/stags become extremely dangerous during the rut. Once the rut begins, hand-reared male offspring will change from being the most docile pet to the most aggressive adversary on the farm. (Miller, 2003)

11.9 USE OF FOSTER SPECIES

Hog deer could be fostered by other hog deer or other deer species such as the Chital and Sika deer. According to Staple (2009) and McCullough & Takatsuki, (2009) the hog deer has been successfully bred to create hybrid with the Chital deer both in Australia and overseas and with the Sika deer.
If requiring milk replacement from other species then fawns could be fed milk or colostrums from other deer species or from goats or ewes. ((Department of Primary Industries, Parks, Water and Environment, 2009 and Bourne, 2009).

11.10 WEANING

• Solid food in the form of grass, hay, and small quantities of concentrates should be available from an early age, even a few days old.
• Water and soil (e.g. a sod of earth, or time outside where soil is available) should be made available from a few days old so that the fawn/kid can have access to minerals in the soil e.g. iron.
• Initial foods offered may include grass, hay, dandelions, chickweed, chopped fruit and vegetables.
• Browse should be available for browsing species from about 1-2 weeks old.
Concentrates offered may be such feeds as a coarse goat mix or a rolled cereal mix. (Bourne, 2009)

According to Miller (2003) weaning should be at approximately 10-14 weeks of age. See Table 7.
Thank you to Teresa Ackard for editing this manual


Altina Wildlife Park . (2008) info@altinawildlife.com 10th November, 2008. RE: Information on Hog Deer. E-mail to E blanch (Emma_Blanch@hotmail.com)


IMEVkC&pg=PA5&lpg=PA5&dq=Geist,+V.+(1998).+Deer+of+the+World:+Their+Evolution,+Behaviour+and+EcoLOGY&source=bl&ots=TJHR5HfwLE&sig=0Wgp0hKoNGu25LBIlnD_jle8jUC4&hl=en&ei=sbk0Sr7zCJL6kAXRL62PCg&sa=X&oi=book_result&ct=result&resnum=2 (accessed 7/6/09)


Taylor, J. (2009) NSW Primary Industries Domestic Quarantine (phone conversation 02 62723933)


http://animaldiversity.ummz.umich.edu/site/accounts/information/AxisPorcinus.html (accessed 5/11/08)

http://www.nelson.wisc.edu/people/mathews/research/deercapture.htm (accessed 19/11/08)

Vertebrate Pest Committee. (2007) [online] List of Exotic Vertebrate Animals in Australia. Available URL:  


Appendix 1  Distribution and conservation status of Hog Deer- Worldwide and Australia
Appendix 2  Deer Yard Design, Requirements and Plans
Appendix 3  Material Safety Data Sheet - Bleach
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Appendix 5  Material Safety Data Sheet - Genesis Pour On
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Appendix 8  IATA Container Requirement 73
Appendix 9  Australian Quarantine and Inspection Requirements
Appendix 10  Material Safety Data Sheet – F10 Super Concentrate Disinfectant
Appendix 11  List of members of the Hog Deer Management Strategy Subcommittee
Appendix 12  Approved Terms of Reference for developing a management strategy for Hog deer in Victoria.
Appendix 13  The Location and estimated size of recognized Hog Deer populations in Victoria
### Distribution and conservation status of hog deer - Worldwide and Australia

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Australia</strong></td>
<td>Hog Deer, <em>Axis porcinus</em> were introduced into Australia, Victoria, in the 1860s. The size of the Victorian population is unknown, however, it is considered that there are no more than several thousand animals distributed in small isolated populations, occurring generally along the south-eastern coast of Victoria, from Cape Liptrap in the west to Lake Tyers in the east. The species is declared to be &quot;wildlife&quot; in Victoria under the <em>Wildlife Act 1975</em>. The species is further declared to be &quot;game&quot; by the Governor in Council Order published in the Government Gazette in 1991. In <strong>Bangladesh</strong></td>
</tr>
<tr>
<td><strong>Bhutan</strong></td>
<td><em>A. p. porcinus</em> occurs in the lowlands of southern Bhutan, but its status is unknown.</td>
</tr>
<tr>
<td><strong>Cambodia</strong></td>
<td>No information.</td>
</tr>
<tr>
<td><strong>China</strong></td>
<td>Restricted to parts of Yunnan bordering Laos and Thailand (Ohtaishi and Gao 1990). No information on status and protected areas.</td>
</tr>
<tr>
<td><strong>India</strong></td>
<td><em>A. p. porcinus</em> found in the grasslands along the Himalayan foothills and the flood-plains of the Ganga and Brahmaputra Rivers (Tandon 1989; Qureshi 1995). Hog Deer are protected in Rajiv Gandhi, Bomadi and Jaldapara Wildlife Sanctuaries; Corbett (200 animals), Dudwa (4,000-5,000), Keibul Lamjao, Rajaji, Kaziranga (8,000-9,000), and Keoladeo National Parks and Manas Tiger Reserve (10,000) (Tandon 1989; Qureshi 1995). Hog Deer have benefited from conservation measures for Rhinoceros and Swamp Deer, since they share wet grassland habitats with these and other <strong>Myanmar</strong></td>
</tr>
<tr>
<td><strong>Nepal</strong></td>
<td><em>A. p. porcinus</em> is abundant in grasslands, but restricted largely to protected areas. Densities range from 0.1 per km² in riverine forest to 16.5 per km² in savanna, and 35 per km² in grassland-flood-plains (Seidensticker 1976; Dhungel and O’Gara 1991). Hog Deer are protected in Kanchanpur Sanctuary; Koshi Tappu, Royal Karnali Bardia and Royal Sukla Phanta (abundant) Wildlife Reserves, Royal Chitwan National Park (abundant). Hog Deer have benefited from conservation measures for rhinoceros and Swamp Deer (<em>Cervus duvaucelli</em>), since they share wet grassland habitats with these and other threatened species (Qureshi 1995).</td>
</tr>
<tr>
<td><strong>Pakistan</strong></td>
<td><em>A. p. porcinus</em> confined to isolated riverine grasslands along the Indus Valley and its upper tributaries. The majority of the population occurs in the Indus River forest reserves of Sind Province, with small populations around the Indus mouth and to the north of Sukkur (Roberts 1977). Hog Deer are protected in Chashma Lake, Taunsa Barrage and Rasso Barrage Wildlife Sanctuaries; Head Islam/Chak Kotora Game Reserve (greatly reduced in numbers) and Lal Suhanra National Park (reintroduced) (World Conservation Monitoring Centre 1992).</td>
</tr>
<tr>
<td><strong>Sri Lanka</strong></td>
<td><em>A. p. porcinus</em> is restricted largely to cultivated landscapes within 35km² area, between Ambalangoda and Indurawa on the south east coast, and inland as far as Elpitiya (McCarty and Dissanayake 1992). There are no areas where the species is protected. Continued survival of the species will depend on controlling hunting and maintaining traditional agricultural land use practices. The land is intensively cultivated and the establishment of protected areas within the range of the species is not possible.</td>
</tr>
<tr>
<td><strong>Thailand</strong></td>
<td><em>A. p. annamiticus</em> was formerly abundant in the Chao Phraya Basin during the early 20th century, but had become extinct in Thailand by the mid 1960s (Humphrey and Bain 1990).</td>
</tr>
<tr>
<td><strong>Vietnam</strong></td>
<td><em>A. p. annamiticus</em> is thought to be close to extinction, having previously been widespread in the south (Ratajczczak 1991). The species occurs at low densities in Daklak, Dong Nai, Gia Lai and Lam provinces (Bang Huy Huynh 1986). There are an estimated 200 in the Tay Nguyen Highlands of southern Vietnam (Dang Huy Huynh 1990). Hog Deer are protected in Sathay Forest Reserve, Yok Don Sanctuary and Nam Catben National Park.</td>
</tr>
</tbody>
</table>

(Source: (Department of Sustainability and Environment Victorian Government, 2008))
9.3 Deer Yard Design, Requirements and Plans
Some form of yard, no matter how simple, is essential on every deer farm right from the time it is first stocked. Yards are required for handling deer, removing velvet or veterinary treatment. There is no such thing as a “standard” deer yard: every farm has its own design, although many are variations of basic schemes (See figs. 2 to 7).

It is not necessary to build elaborate yards, especially if a herd is small. As long as there is a sufficient number of holding pens or paddocks, the actual yards for close handling of stock can be kept to a minimum. Good design makes provision for future extensions. Even when deer are kept in a yard temporarily, they should be given a space of 5 – 6 m² per animal.

9.3.1 Siting
Yards should be as central as possible for stock movement to and from the various parts of a farm, but they are frequently located on the outer edge of a farm and connected to paddocks by a race system.

Manoeuvering stock into yards will be easier if they are located near to or within a grove of trees or bush. A sheltered spot also offers greater comfort and convenience for stock and workers.

Opinions differ as to whether access to yards should be uphill or down: deer are less likely to break back when moving downhill. If they break back when going uphill the outcome is potentially disastrous for fences and stock alike.

Figure 2

DEER YARD DESIGN 1
This simple set of yards is built into an existing shed. They consist basically of a circular crush with two swinging gates at one end of the barn and two pens at the other. Access to the pens from the crush is by a fixed weighing platform, with adjustable sides, which can also be used for veterinary inspection, etc. This basic design can be easily extended with the addition of other pens round the circle, thus, forming the covered and darkened handling section of a more extensive set of yards. (After Ministry of Agriculture and Fisheries, New Zealand)

Figure 3
DEER YARD DESIGN 2

Five completely covered and darkened pens are easily accessible from an open ‘D’ shaped crush which functions as an auction ring. Buyers obtain a clear view of stock in the ring from an embankment to the left. Deer move well in this design. (After Ministry of Agriculture and Fisheries, New Zealand)
DEER YARD DESIGN 3

This plan is very flexible and versatile. The outer ring can act as a circular race or be divided into up to eight pens of varying size.

The central, circular crush with its two gates and the gates of the outer ring allow multi-way drafting, either inwards or outwards.

A slight modification would allow direct access for stock from the entry race to the central circle if desired. The entry race is close boarded for about 9 m. (After Ministry of Agriculture and Fisheries, New Zealand)
DEER YARD DESIGN 4
A small, inexpensive design that would suit many small herds. It holds up to 100 animals and yet has the basic requirements of a circular crush pen and small pens leading off a central race. Although these yards are built in a totally enclosed shed, additions and alterations would be relatively simple. Large holding pens could be added around the shed. (After Ministry of Agriculture and Fisheries, New Zealand)
A very effective facility for handling large numbers of red deer. With its darkened velveting rooms it is particularly suitable for stage. The large land in race and surrounding paddocks provide good holding areas, particularly useful when velveting is in progress. More pens have been added to the original design next to the velveting room and sale pens have been built to the left of the entry race.

The traditional style of drafting gates, not normally considered appropriate for deer, have worked well in this instance because animals are coming to them round a curve. This section could be replaced with a weighing platform.

(Food & Agriculture Organisation of the United Nations, 1982)
Appendix 3.

MATERIAL SAFETY DATA SHEET – BLEACH

STATEMENT OF HAZARDOUS NATURE

Not classified as hazardous according to criteria of WorkSafe Australia.

COMPANY DETAILS

Company: CHEMICAL FORMULATORS PTY. LTD.
A.C.N. 008 905 119
Address: 7 Kirke Street, Balcatta, WA 6021.
Phone (08) 9344 2455
Fax (08) 9344 4090

IDENTIFICATION

Product Name: BLEACH
Other Names: Hypochlorite Solution
UN Number: None allocated
Dangerous Goods Class: None allocated
Subsidiary Risk: None allocated
Hazchem Code: None allocated
Poisons Schedule: None allocated
Use: Bleach

Physical Description / Properties

Appearance: Clear liquid (chlorine odour)
Boiling Point: Above 100°C
Vapour Pressure: Not Available
Specific Gravity: 1.65
Flashpoint: Not Relevant
Flammability Limits: Not Relevant
Solubility Limits: Miscible in all proportions.

Other Properties:

Corrosiveness: Corrosive to non-ferrous metals & fabric
pH (undiluted): 12.5

Ingredients

All hazardous substances as defined by the NOHSC Code are listed by chemical name and CAS No. Other ingredients which are determined to be non-hazardous are listed by generic name or as non hazardous ingredients.

Chemical Name: Sodium Hypochlorite
CAS No: 7681-52-9
Proportion: Less than 10%
Chemical Name: Water
Proportion: Up to 100%

HEALTH HAZARD INFORMATION

Health effects

Acute:

Swallowed: Corrosive. Causes burns to mouth, throat and gastro-intestinal tract.
Eye: Very corrosive. Causes severe burns. Risk of serious damage to eyes.
Skin: Corrosive. Causes severe burns.
Inhaled: Corrosive mist.

Chronic:

Prolonged exposure to low concentration solutions may cause skin irritation to skin, eyes and mucous membranes.

First Aid

Swallowed: Contact a Doctor or Poisons Information Centre. Do NOT induce vomiting. Give a glass of water. Repeat if vomiting occurs. If the patient is not fully conscious do not give anything by mouth.

Eye: In case of contact with eyes, rinse immediately with plenty of water and contact a doctor or Poisons Information Centre. Get urgent medical attention.

Skin: Remove contaminated clothing immediately and wash skin thoroughly with water.

Inhaled: Leave contaminated area.

First Aid Facilities:

Eye wash. Fresh water.

Advice to Doctor:

Corrosive product. Treat chemical burns if present.

PRECAUTIONS FOR USE

Exposure Standards:

No value assigned for hypochlorite solution by Worksafe Australia.

Engineering Controls:

Avoid generating and inhaling mists without appropriate ventilation.

Personal Protection:

Avoid contact with the skin and eyes. Avoid breathing mist. Wear face shield, overalls or apron, protective footwear and natural rubber or PVC gloves when using undiluted product.

Flammability:

Not flammable or combustible.

SAFE HANDLING INFORMATION

Storage and Transport:

Store in a cool, well ventilated area away from all other chemicals, keep containers closed at all times.

Spills and Disposal:

May be flushed to sewer with water but prevent larger spillages from entering stormwater drains or water courses. To contain spillages, absorb on sand or similar absorbing material, such as Attapulgite, and collect in drums. Residues may be flushed away with water.

Fire/Explosion Hazard:

Not applicable as product is non-combustible.

Other Information:

Do not mix with acids as toxic chlorine gas may be liberated.

This MSDS is valid for five years from date of issue but readers should contact Chemform to ensure that this is the latest issue. As per the Worksafe Guidance Note NOHSC 3017, each user should review the information in the specific context of the intended application.

Contact Point: Technical Manager (08) 9344 2455

ISSUE DATE: APRIL 2001

(Statewide Cleaning Services, 2008)
MATERIAL SAFETY DATA SHEET

STATEMENT OF HAZARDOUS NATURE:
Not determined to be hazardous according to the criteria of Worksafe Australia

COMPANY DETAILS:
Novartis Animal Health Australasia Pty Ltd.
A.C.N. 076 745 198
54 Waterloo Road,
North Ryde NSW 2113
Telephone No.: (02) 9805 3555
Fax No.: (02) 9888 8387

IDENTIFICATION

PRODUCT NAME: FASINEX® 100 Oral Flukicide for Sheep, Cattle and Goats (Australia)
FASINEX® 10 (New Zealand)

Formulation type: aqueous suspension
Active Ingredients: triclabendazole
CIBA-GEIGY Code Nos.: CGA 89317
Chemical type: benzimidazole derivative
UN Number: none allocated
Dangerous Goods Class: none allocated
Subsidiary Risk: none allocated
Hazchem Code: none allocated
Poisons Schedule: exempt

USE: As a drench for the treatment of immature and mature liver fluke (Fasciola hepatica) in sheep and goats (Australia) and in sheep, cattle and goats (NZ). Refer to the product label for full use instructions.

PHYSICAL DESCRIPTION/PROPERTIES

Appearance: Milky liquid
Flash Point: >61°C (closed cup)
Odour: Non-specific
Flammability: Non-flammable
Specific gravity (H2O=1): 1.03 (20°C)
Combustibility: Non-combustible
Behaviour in water: Soluble
Volatile: Non-volatile
Viscosity: 200-300 cps
Corrosiveness: Non-corrosive

INGREDIENTS

triclabendazole (technical grade)  [68786-66-3]
to give triclabendazole 10
polyvinyl pyrrolidone  <10
microcrystalline high molecular weight carbohydrate polymer  <1
benzoic acid [65-85-0]  <1
other non-hazardous ingredients <10
water  to 100

HEALTH HAZARD INFORMATION

HEALTH EFFECTS

ACUTE
Toxicity - This product is unlikely to present a hazard during normal use.
Swallowed: LOW TOXICITY
Tests on rats indicate a low toxicity following single doses of the product.
(LD50 >5000 mg/kg)

Dermal absorption: LOW TOXICITY
Tests on rats using the active ingredient indicate a low toxicity due to skin contact with the product.
(LD50 >4000 mg/kg, triclabendazole technical)

Inhaled: LOW TOXICITY
Tests on rats using active ingredient indicate a low toxicity due to inhalation of the product.
(LC₅₀ (4 h) >500 mg/m³, triclabendazole technical)

**Irritation**
Eye: (rabbit) SLIGHT-IRRITANT
Skin: (human experience) SLIGHT-IRRITANT

**Sensitisation** - (based on studies with rabbits)
Skin: NON-SENSITISER

**Poisoning Symptoms**
No human poisoning due to this product have been recorded. The poisoning symptoms observed in experimental animals were non-specific.

**CHRONIC (Active Ingredient)**
Triclabendazole technical has been extensively tested on laboratory mammals and in test-tube systems. The administration of large doses of triclabendazole technical was associated with benign liver tumours in female mice. No evidence of mutagenic, carcinogenic, teratogenic or reproductive effects was obtained. The relevance to humans of the liver tumour finding is doubted.

**FIRST AID**
Swallowed: If poisoning occurs contact a doctor or Poisons Information Centre.
*Phone Australia 131126; New Zealand 03 4747000.*
Eye: Flush gently with large quantities of clean tap water for at least 15 minutes.
Skin: Remove contaminated clothing and wash affected areas thoroughly with soap and water.
Inhaled: Move affected person to fresh air and keep at rest until recovered.

**ADVICE TO DOCTOR**
No specific antidote exists. Treat symptomatically.

**PRECAUTIONS FOR USE**

**ALWAYS READ AND FOLLOW THE LABEL INSTRUCTIONS AND WARNINGS**

**EXPOSURE STANDARDS**
No exposure standards have been established for the components of this product.

**Exposure Potential** - Swallowing is unlikely under normal conditions of usage. Significant skin uptake does not occur.

**ENGINEERING CONTROLS**
No special requirements. Product is used outdoors.

**PERSONAL PROTECTION**
Avoid contact with eyes and skin. After use and before eating, drinking or smoking, wash hands, arms and face thoroughly with soap and water.

**FLAMMABILITY**
This product is NON-FLAMMABLE.
SAFE HANDLING INFORMATION

STORAGE AND TRANSPORT
Store in tightly sealed original containers in a dry secure place away from feed and food. Store out of direct sunlight. Keep out of reach of children, unauthorised persons and animals.

SPILLS AND DISPOSAL
In case of spillage it is important to take all steps necessary to:
- Avoid eye and skin contact.
- Avoid contamination of waterways

Procedure for spill:
1. Keep all bystanders away.
2. Wear full length clothing and PVC gloves.
3. Reposition any leaking containers so as to minimise further eakage.
4. Dam and absorb spill with an absorbent material (e.g. sand or soil).
5. Shovel the absorbed spill into drums.
6. Disposal of the absorbed material will depend upon the extent of the spill.
   - For quantities up to 50L of product bury in a secure landfill site.
   - For quantities greater than 50L seek advice (use emergency contact number below) from the manufacturer before attempting disposal. Contain in a secure location until disposal method is established.
7. Decontaminate the spill area with detergent and water and rinse with the smallest volume of water practicable.

Dispose of empty, used containers by:
(a) Triple rinsing with water. Add the rinsings to the tank mix or dispose of rinsate in a disposal pit away from desirable plants and their roots, and watercourses. On-site disposal of undiluted product is unacceptable.
(b) Breaking, crushing or puncturing the container to prevent reuse.
(c) Disposing of in a local authority landfill site that does not burn its refuse. If there is no local authority landfill readily available in your area, bury the containers under at least 50 cm of soil at a licensed/approved disposal site. DO NOT burn empty containers or product.

FIRE/EXPLOSION HAZARD
This product is non-flammable, non-explosive and non-combustible.

OTHER INFORMATION
Triclabendazole technical is highly toxic to fish \( \text{LC}_{50} \) (96 h), rainbow trout = 0.14 mg/L] and slightly toxic to birds.

Note: This product is a registered veterinary chemical and must therefore be used in accordance with the container label directions. A comprehensive package of toxicological and environmental data for the active ingredients of this product has been submitted to health and environment authorities and has been evaluated by expert toxicologists and environmental scientists.

CONTACT POINT: Regulatory Affairs Manager - Animal Health - (+612) 8805 3555

This Material Safety Data Sheet summarises our best knowledge of the health and safety hazard information of the product and how to safely handle and use the product in the workplace. Each user should read this MSDS and consider the information in the context of how the product will be handled and used in the workplace including in conjunction with other products.

If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact this company.

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(Agtech, 2006)
### Appendix 5

**Ancare New Zealand Ltd.**

**Genesis Pour On**

**SAFETY DATA SHEET**

#### Section 1: Identification of the Substance and Supplier

<table>
<thead>
<tr>
<th>Product name</th>
<th>Genesis Pour On</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended use</strong></td>
<td>For the control and treatment of internal and external parasites in cattle and deer.</td>
</tr>
<tr>
<td><strong>Company details</strong></td>
<td>Ancare New Zealand Ltd.</td>
</tr>
<tr>
<td><strong>Address</strong></td>
<td>17 Shea Tce., Takapuna</td>
</tr>
<tr>
<td><strong>Telephone number</strong></td>
<td>(09) 489 4060 [8.30am to 5 pm]</td>
</tr>
<tr>
<td><strong>Emergency telephone Numbers</strong></td>
<td>National Poisons Centre: 0800 764 766 (0800 POISON)</td>
</tr>
<tr>
<td></td>
<td>Fire Brigade, Transport Emergency Phone 111</td>
</tr>
<tr>
<td><strong>Date of preparation</strong></td>
<td>11 April 2006</td>
</tr>
</tbody>
</table>

#### Section 2: Hazardous Identification

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<thead>
<tr>
<th>Hazard classifications</th>
<th>6.1D Acute oral toxin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6.4A Eye irritant</td>
</tr>
<tr>
<td></td>
<td>6.5B Contact sensitiser</td>
</tr>
<tr>
<td></td>
<td>6.8B Reproductive/developmental toxin</td>
</tr>
<tr>
<td></td>
<td>6.8C Reproductive/developmental toxin via lactation</td>
</tr>
<tr>
<td></td>
<td>6.9B Target organ toxin</td>
</tr>
<tr>
<td></td>
<td>9.1A Aquatic toxin</td>
</tr>
<tr>
<td></td>
<td>9.2B Soil toxin</td>
</tr>
<tr>
<td></td>
<td>9.3C Vertebrate toxin</td>
</tr>
<tr>
<td></td>
<td>9.4A Invertebrate toxin</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Priority identifiers</th>
<th>WARNING KEEP OUT OF REACH OF CHILDREN</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>WARNING Dangerous to the environment</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary identifiers</th>
<th>6.1D May be harmful if swallowed. Wash hands and exposed skin before meals and after use.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6.4A May cause eye irritation. Avoid contact with eyes.</td>
</tr>
<tr>
<td></td>
<td>6.5B Repeated exposure may cause skin allergy. Avoid skin contact.</td>
</tr>
<tr>
<td></td>
<td>6.8B Abamectin possibly may affect development and/or reproduction. Handle with care.</td>
</tr>
<tr>
<td></td>
<td>6.8C Abamectin possibly may have effects on or via lactation. Handle with care.</td>
</tr>
<tr>
<td></td>
<td>6.9B Abamectin possibly may affect the nervous system. Handle with care.</td>
</tr>
<tr>
<td></td>
<td>9.1A Very toxic to aquatic organisms. Avoid contamination of any water supply with product or empty container.</td>
</tr>
<tr>
<td></td>
<td>9.2B Toxic to the soil environment. Avoid release to the environment.</td>
</tr>
</tbody>
</table>
9.3C Harmful to terrestrial vertebrates. Avoid release to the environment.
9.4A Very toxic to terrestrial invertebrates. Avoid release to the environment.

Section 3: Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No.</th>
<th>Proportion g/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abamectin</td>
<td>71751-41-2</td>
<td>10</td>
</tr>
<tr>
<td>Benzenemethanol</td>
<td>100-51-6</td>
<td>150-200</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>to 1L</td>
</tr>
</tbody>
</table>

Section 4: First Aid Measures

For advice contact the National Poisons Centre on 0800 POISON (0800 764 766), or a doctor immediately.

INGESTION: If swallowed seek medical attention. Do NOT induce vomiting.
EYES: If splashed in eyes wash out immediately with water.
SKIN: If skin or hair contact occurs remove contaminated clothing and flush skin and hair with running water.
INHALATION: Remove to fresh air.

Workplace facilities | Hygiene practices |
---------------------|------------------|
No special facilities required. | Observe good work practices and avoid skin and eye contact. Wash hands and exposed skin before meals and after use. Do not eat or drink while using. Launder protective clothing separately from other clothing, and before each reuse.

Notes for medical personnel | Apply symptomatic therapy (no specific antidote). Note the nature of the product.

Section 5: Fire Fighting Measures

Type of hazard | Fire hazard properties |
----------------|------------------------|
Non flammable, Combustible, Non explosive | Genesis Pour On is not classified as flammable, and will support combustion (oil). Hazardous fumes when heated to decomposition.

Regulatory Requirements | Extinguishing media and methods |
-------------------------|----------------------------------|
Not applicable | Treat the fire as for the other materials present. Do not allow water to enter drains.

Hazchem code | 2X
| Recommended protective clothing | When fighting a major fire wear full protective clothing including breathing apparatus. |
| Section 6: Accidental Release Measures | |
| Emergency procedures | Wear suitable protective clothing. Restrict access to contaminated area. Contain the spill and prevent further dispersion. Retrieve intact containers from site. Place damaged containers into containment devices. Absorb spills with inert material and place in waste containers. Wash the area with water and absorb with further inert material. Collect spilled material and place in sealable containers for subsequent disposal. Prevent contamination of water courses or sewers. Dispose of waste safely. |
| Section 7: Handling and Storage | |
| Precautions for safe Handling | Apply with well-maintained and calibrated equipment. Handle with care. |
| Approved handlers | Not required |
| Conditions for safe Storage | Store below 30°C in a cool place away from direct sunlight. Store in carton, with top secured. Keep out of reach of children. |
| Packaging | Packaging Schedule 3 (UN Packing Group III) for quantities >5L (Hazardous Substances Packaging Regulations 2001). |
| Store site requirements | This substance is subject to a requirement for an emergency management plan, secondary containment and signage, whenever it is held in quantities of 100L or more. See Hazardous Substances (Emergency management) regulations 25 to 42. |
| Section 8: Exposure Control / Personal Protecti | |
| Workplace exposure standards. | Dusts 10mg/m³ |
| Application in the Workplace | Prevent exposure by using engineering controls, personal protective equipment and work practices that prevent skin and eye contact. |
| Exposure standards outside the workplace | TELs and EELs are not set at this time. |
Engineering controls | Ensure that ventilation maintains dust levels below WES.
--- | ---
Personal protection | Clothing should consist of overalls with long sleeves, and impervious gloves. Eye protection is advised (eg. goggles or face shield).

### Section 9: Physical and Chemical Properties

**Genesis Pour On**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formulation type</td>
<td>Oily solution</td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear, yellow liquid</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>~0.9 g/ml</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>&gt;400° C</td>
</tr>
<tr>
<td>Vapour Pressure</td>
<td>NA</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Abamectin is insoluble in water</td>
</tr>
</tbody>
</table>

### Section 10: Stability and Reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability of the substance</td>
<td>Stable under normal conditions of use and storage.</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>No specific conditions to avoid.</td>
</tr>
<tr>
<td>Material to avoid</td>
<td>No specific materials to avoid.</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>No hazardous products are expected, except when heated to decomposition.</td>
</tr>
<tr>
<td>Hazardous polymerisation</td>
<td>Components are not expected to form hazardous polymers.</td>
</tr>
</tbody>
</table>

### Section 11: Toxicological Information

**Genesis Pour On**

May be harmful if swallowed. May cause eye irritation. Repeated exposure may cause skin allergy. Danger of serious damage to health by prolonged exposure if swallowed. Abamectin possibly may affect development and/or reproduction. Abamectin possibly may have effects on or via lactation. Abamectin possibly may affect the nervous system.
INGREDIENTS

Abamectin
Abamectin is an acute oral toxin \([\text{LD}_{50} \text{ (oral)} \ 8.7-12.8 \text{mg/kg}]\). Ingestion of a single large dose of abamectin by humans (\(\sim 100 \text{mg/kg}\)) was associated with coma, hypotension and respiratory failure. Clinical signs in repeated dose laboratory animal studies included ataxia, tremor, mydriasis, emesis, pupil dilation and coma. High doses produced respiratory failure and deaths. The critical adverse effects in multigenerational reproductive studies were mortality and reduced weight gain of pups in early lactation (NOAEL 0.12mg/kg/d).

Benzenemethanol
An organic alcohol that is used as a preservative \([\text{LD}_{50} \text{ (oral, rabbit)} \ 1050 \text{mg/kg}; \ \text{LD}_{50} \text{ (dermal, rabbit)} \ 2000 \text{mg/kg}]\). It is a known skin sensitiser (contact dermatitis) and a moderate eye irritant.

Section 12: Environmental Information

Genesis Pour On
Very toxic to aquatic organisms. Toxic to the soil environment. Harmful to terrestrial vertebrates. Very toxic to terrestrial invertebrates.

INGREDIENTS

Abamectin
Abamectin is a highly effective insecticide and acaricide produced by the soil microbe \(\text{Streptomyces avermitilis}\). It acts by stimulating the release of gammaaminobutyric acid, an inhibitory neurotransmitter, causing paralysis of the parasite. It is highly toxic to invertebrates in the aquatic, soil and terrestrial environments. Aquatic organisms: Abamectin is highly toxic to fish and extremely toxic to aquatic invertebrates \([\text{LC}_{50} \text{ Rainbow trout is } 3.6 \text{ ppb (96hrs); } \text{LC}_{50} \text{ Daphnia magna } 0.34 \text{ ppb (48hrs)} ]\). Persist: yes. Soil organisms: Dung beetle Terrestrial fate value 20-40. Abamectin is toxic to mammals \([\text{LD}_{50} \text{ (oral, rats)} \ 8.7 \text{mg/kg}], but is less toxic to birds \([\text{LC}_{50} \text{ Bobwhite quail } >2000 \text{mg/kg}]. \text{Abamectin is highly toxic to bees } [\text{LD}_{50} \text{ (oral)} 0.0094\mu\text{g/bee}; \text{LD}_{50} \text{ (contact) } 0.002\mu\text{g/bee}].

Benzenemethanol
An organic alcohol that is used as a preservative. Benzenemethanol is toxic to aquatic and soil organisms \([\text{LC}_{50} \text{ Lepomis macrochirus } 10\text{mg/mL (96hrs); } \text{EC}_{50} \text{ Daphnia magna } 55\text{mg/L (24hrs); } \text{EC}_{50} \text{ microbial } 50\text{mg/L} ]\) and is a potential terrestrial vertebrate toxin based on laboratory animal toxicity data \([\text{LD}_{50} \text{ (oral, rabbit)} \ 1050 \text{mg/kg}]\).

Section 13: Disposal Considerations
Preferably dispose of the product by use. Otherwise dispose of product and packaging at an approved landfill or other approved facility. Avoid contamination of any water source. Burn empty container in an appropriate incinerator, if circumstances such as wind direction permit. Otherwise crush or puncture and bury in a suitable landfill. Do NOT use container for any other purpose.
### Section 14: Transport Information

**Dangerous Goods for transport.**
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Abamectin 1%)

**UN Number:** 3082  
**Dangerous Goods Class:** 9

The maximum quantity per package of this substance allowed for carriage on public transport is 1L.

### Section 15: Regulatory Information

Registered pursuant to the ACVM Act 1997, No. A7353  
See [www.nzfsa.govt.nz/acvm](http://www.nzfsa.govt.nz/acvm) for registration conditions

Approved pursuant to the HSNO Act, Approval Code HSR001958  
See [www.ermanz.govt.nz](http://www.ermanz.govt.nz) for approval conditions

SDS is required for quantities greater than or equal to 1L

### Section 16: Other Information

Additional information The information contained herein is given in good faith, but no warranty, expressed or implied, is made. Consult **Ancare New Zealand Ltd. for further information.**

(My Farm Store Ltd, 2008)
Appendix 6.

**Product Name: Cydectin Pour On (A6203)**

Issued: 11 July 2007

SAFETY DATA SHEET

### Section 1 – Identification of the Substance and Supplier

**Product Name:** Cydectin Pour On

**Recommended Use:** For the treatment and control of internal and external parasites of cattle (including lactating dairy cattle) and for the treatment and control of lungworm and roundworms of deer.

**Company Details:** Fort Dodge New Zealand Limited

**Address:** 4 Fisher Crescent, Mt Wellington, Auckland

**Telephone No:** 09 276 9393

**Emergency Telephone No:** FREE PHONE 0800 734 607 – 24 hour emergency advice

National Poisons Centre: 0800 764 766 (0800 POISON)

Emergency Services: In an emergency dial 111

**Date of Preparation:** 11 July 2007

**Replaces Version Issued:** 22 June 2006

### Section 2 – Hazardous Identification

**Hazard Classifications:**
- 6.3B Skin irritant
- 6.8B Reproductive toxin
- 6.8C Reproductive toxin via lactation
- 9.1A Aquatic toxin
- 9.2C Soil toxin
- 9.4B Terrestrial invertebrate toxin

**Priority Identifiers:**
- WARNING. Dangerous to the environment.

**Secondary Identifiers:**
- 6.5B May cause mild skin irritation. Avoid skin contact. Avoid skin contact.
- 6.8B Moxidectin possibly may affect development and/or reproduction. Handle with care.
- 6.8C Moxidectin may have effects on or via lactation. Handle with care.
- 9.1A Very toxic to the aquatic environment. Avoid contamination of any water supply with product or empty container.
- 9.2C Harmful to the soil environment. Avoid release to the environment.
- 9.4C Toxic to terrestrial invertebrates. Avoid release to the environment.
Section 3 – Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>CAS No</th>
<th>Conc. %w/v</th>
</tr>
</thead>
<tbody>
<tr>
<td>113507-06-5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Moxidectin
Other ingredients

Section 4 – First Aid Measures

General Information:
If poisoning or irritation occurs, call a doctor or the Poisons Information Centre 0800 POISON (0800 764 766), which is available at all times. Have this SDS with you when you call.

Inhalation: No first aid measures normally required. However, if vapours or dusts have been inhaled, and irritation has developed, remove to fresh air and observe until recovered. If irritation becomes painful or persists more than about 30 minutes, seek medical advice.

Skin Contact: If product gets on skin, thoroughly wash contacted areas. If irritation persists, seek medical attention.

Eye Contact: If product gets in eyes, wash material from them with running water. If irritation persists, seek medical attention.

Ingestion: If product is swallowed do NOT induce vomiting. If symptoms develop, or if in doubt contact the Poisons Information Centre or a doctor.

Workplace Facilities: No special requirements

Hygiene Practices: Avoid contact with eyes and skin. Always wash hands before smoking, eating or using the toilet. Wash contaminated clothing and other protective equipment before storing or re-using.

Notes for Medical Personnel: Treat symptomatically. Note the nature of this product.

Section 5 – Fire Fighting Measures

Type of Hazard: Non-inflammable, non-explosive.

Fire Hazard Properties: There is no risk of an explosion from this product under normal circumstances if it is involved in a fire. Combustible.
Fire decomposition products may be hazardous if inhaled.
Do not allow fire water to enter waterways.

Regulatory Requirements: Non applicable

Extinguishing Media and Methods: Fire Fighting: If a significant quantity of this product is involved in a fire, call the fire brigade
Extinguishing Media: CO₂, dry chemical, foam, water fog.

Hazchem Code: 2X
Recommended Protective Clothing: When fighting fires involving significant quantities of this product, wear safety boots, non-flammable overalls, gloves, hat, goggles and respirator.
Section 6 – Accidental Release Measures

Emergency Procedures: In the event of a major spill, prevent spillage from entering drains or water courses. Evacuate the spill area and deny entry to unnecessary and unprotected personnel. Wear full protective clothing including face mask, face shield and gauntlets. All skin areas should be covered. Stop leak if safe to do so, and contain spill. Absorb onto sand, vermiculite or other suitable absorbent material. Sweep up and shovel or collect recoverable product into polymer containers for recycling or salvage. After spills, wash area preventing runoff from entering drains. If a significant quantity of material enters drains, advise emergency services. Dispose of only in accord with all regulations.

Section 7 – Handling and Storage

Precautions for Safe Handling: Keep exposure to this product to a minimum, and the quantities kept in work areas. Check Section 8 of this SDS for details of personal protective measures, and make sure that those measures are followed. The measures detailed below under "Storage" should be followed during handling in order to risks to persons using the product in the workplace.

Approved Handlers: Not required.


Packaging: Packaging Schedule 3 (UN Packing Group III) for quantities >5L.
(Hazardous Substances Packaging Regulations 2001)

Store Site Requirements: A requirement for an emergency management plan, secondary containment and signage whenever quantities of 100L or more are stored.

Section 8 – Exposure Control / Personal Protection

This SDS describes personal protective measures relating to long term industrial and manufacturing exposure, and emergency situations, such as accidents and spills. See product label for personal protective measures during normal on farm usage (if required).

Workplace Exposure Standards: None set

Dusts 10 mg/m³

Application in the Workplace: See Engineering controls.

Exposure Standards Outside the Workplace: The ADE for moxidectin is set at 0.002mg/kg bw.day
The PDEfood for moxidectin = 0.0014mg/kg bw/day
The PDEdrinking water for moxidectin = 0.0004mg/kg bw/day
The PDE\text{dermal} for moxidectin = 0.0002mg/kg bw/day
The TEL\text{skin surface deposition} for moxidectin = 0.03mg/m^2
The EEL\text{water} for moxidectin = 0.0000003mg/L

Engineering Controls: In industrial situations, concentration values below the TWA value should be maintained. Values may be reduced by process modification, use of local exhaust ventilation, capturing substances at the source, or other methods. If you believe air borne concentrations of mists, dusts or vapours are high, you are advised to modify the process or environment to reduce the problem.

Personal Protection: Respiratory Protection: It is usually safe to not use a dust mask or respirator protection on account of this product. However, if the product is being used in dusty or confined conditions, use of a mask or respirator may be preferred. For help in selecting suitable equipment, consult AS/NZS 1715.

Protective Gloves: Impermeable protective elbow length gloves should be worn when you are using this product, to prevent skin contact. For help in selecting suitable equipment, consult AS/NZS 2161.

Eye and Face Protection: Protective eyewear and face protection should be worn when using this product. Consult AS/NZS 1336 and AS/NZS 1337 for advice on Industrial Eye Protection.

Clothing: Clean overalls or protective clothing should be worn, preferably with an apron. Consult AS 2919 for advice on Industrial Clothing.

Safety Boots: Wearing safety boots in industrial situations is advised. Consult AS/NZS 2210 for advice on Occupational Protective Footwear.

Section 9 – Physical and Chemical Properties

Physical Description and Colour: Clear oily liquid
Odour: Mild characteristic hydrocarbon odour
Boiling Point: No specific data. Expected to begin boiling at about 160°C at 100kPa.
Freezing/Melting Point: No specific data. Liquid at normal temperatures.
Volatiles: No specific data. Expected to be low at 100°C.
Specific Gravity: 0.91-0.93
Water Solubility: Insoluble

Section 10 – Stability and Reactivity

Stability of the Substance: This product is unlikely to react or decompose under normal storage conditions. However, if you have any doubts, contact the supplier for advice on shelf life properties.

Conditions to Avoid: Store as recommended (see Section 7). No special conditions to avoid.
Material to Avoid:
No particular incompatibilities.

Hazardous Decomposition
This product is unlikely to spontaneously decompose.

Products:
Hazardous Polymerisation
This product is unlikely to spontaneously polymerize.

Section 11 – Toxicological Information

Cydectin Pour On:
May cause mild skin irritation. Prolonged oral exposure may be hazardous. Moxidectin may develop and/or reproduction. Moxidectin may have effects on or via lactation.

Ingredients:
Moxidectin is a macrocyclic lactone, structurally similar to ivermectin, abamectin and milbemycin. Moxidectin is an acute oral toxin with nervous system effects [LD$_{50}$ (oral, mice) 42mg/kg, LD$_{50}$ (dermal) is $>2000$ mg/kg]. Only mild signs of skin irritation were seen (rabbit, exposure for up to 72hrs). Moderate eye irritation was noted (rabbit), but signs resolved 48-72hrs after treatment. Laboratory rodent reproductive studies reported foetal malformations, decrease in number of live births, reduced pup weights and neonatal & lactational deaths [lowest NOEL 0.4 mg/kg/day]. A chronic feeding study (90 days; 0 to 1.6 mg/kg/d) induced toxicity in dogs. At the highest dose lacrimation, tremors, salivation, slight ataxia and a languid appearance were reported. Dose-dependant reductions in absolute body weight and food consumption were noted [NOEL 0.3mg/kg]. In a second study (52 weeks; 0-1.15mg/kg/d), no signs of toxicity occurred and body weights remained comparable to controls throughout the study [NOEL 1.15mg/kg]. Moxidectin is not mutagenic or carcinogenic.

Section 12 – Environmental Information

Cydectin Pour On:
Very toxic to the aquatic environment. Harmful to the soil environment. Toxic to terrestrial invertebrates.

Ingredients:
Moxidectin is very toxic to aquatic life [Bluegill sunfish LC$_{50}$ (96hrs) 0.62 ppb; Rainbow trout LC$_{50}$ (96hrs) 0.16 ppb; Daphnia magna EC$_{50}$ (48 hrs) 30 ppt; bioaccumulative] and soil life [Dung beetle EC$_{50}$ are 2.5677mg/kg; 0.4693mg/kg & 0.134mg/kg. Soil DT$_{50}$ $>$ 30 days]. Moxidectin is also very toxic to terrestrial vertebrates [LD$_{50}$ (mice) = 42mg/kg] and bees [LD$_{50}$ (oral) = 0.46ug/bee; LD$_{50}$ (contact) 0.025ug/bee].

Section 13 – Disposal Considerations

Preferably dispose of the product by use. Otherwise dispose of product and packaging at an approved landfill or other approved facility. Crush or puncture empty container and bury in a suitable landfill. Care must be taken to ensure that the EEL is not exceeded outside the disposal site. Do not use container for any other purpose.
Section 14 – Transport Information

UN Number: 3082
Dangerous Goods Class: 9
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Moxidectin 0.5%)

The maximum quantity per package of this substance allowed for carriage on public transport is 10L.

Section 15 – Regulatory Information

Registered pursuant to the ACVM Act 1997, No. A6203
See www.nzfsa.govt.nz/acvm for registration conditions
ERMA Approval Code: HSR001850
See www.ermanz.govt.nz/search-registers for controls.

Section 16 – Other Information

THIS SDS SUMMARISES OUR BEST KNOWLEDGE OF THE HEALTH AND SAFETY HAZARD INFORMATION OF THE PRODUCT AND HOW TO SAFELY HANDLE AND USE THE PRODUCT IN THE WORKPLACE. EACH USER MUST REVIEW THIS SDS IN THE CONTEXT OF HOW THE PRODUCT WILL BE HANDLED AND USED IN THE WORKPLACE.

IF CLARIFICATION OR FURTHER INFORMATION IS NEEDED TO ENSURE THAT AN APPROPRIATE RISK ASSESSMENT CAN BE MADE, THE USER SHOULD CONTACT THIS COMPANY SO WE CAN ATTEMPT TO OBTAIN ADDITIONAL INFORMATION FROM OUR SUPPLIERS.
Purina Mills® AntlerMax® Deer Chow® 20 59SB
Designed for the Life of Your Deer™

What It Is:
A 20%-protein pelleted ration designed to enhance the deer’s natural forage diet. The high protein content supports top performance with patented AntlerMax® Protein Technology to promote superior antler growth in bucks, reproductive success and abundant milk production in does and assure optimum growth and healthy development in fawns. Contains proprietary AntlerMax® Mineral Technology, a power-packed nutritional package with ideal amounts and ratios of vitamins and minerals for superior antler density and strength, optimum reproductive performance and healthy fawns.

FEATURES BENEFITS
AntlerMax® Protein Superior Antler Size and Mass Technology Promotes antler growth by improving protein quality. The unique digestive tract of deer reduces the quality of most proteins by breaking them down too quickly and diluting their value for antler growth. AntlerMax® Protein Technology protects high-quality proteins from early breakdown and delivers a higher concentration to the growing antler.

Develops Exceptional Body Size
High-quality protein helps build muscle for exceptional body size.

Top Reproductive Performance and Strong Healthy Fawns Provides critical nutrients to help assure top fertility. Helps to increase milk production and milk quality and strong, healthy fawns with high survival rates.

Supplements Poor or Sparse Forage
So deer can maintain vigor during periods of environmental nutritional stress.

AntlerMax® Mineral Optimal Antler Growth, Density and Strength Technology A power-packed nutritional package with ideal amounts and ratios of vitamins and minerals for optimal antler growth, reproductive success and enhanced growth rates.

Strong Apple Flavor High Palatability
Enhanced with strong apple flavor to attract deer and elk to the feed to so they receive the benefit of a balanced diet.

High Quality Ingredients Optimum Performance
Superior ingredients ensure high feed intake for optimum performance.
**Purina Mills® AntlerMax® Deer Chow® 20 59SB**

**Designed for the Life of Your Deer™**

**How and When to Feed:**

4. Feed Purina Mills® AntlerMax® Deer Chow® 20 to deer, elk and other game starting in January when antler development begins through September or until antler growth is complete (antlers harden).

5. Feed free-choice with adequate native forage or good quality hay.

6. Place under shelter near high animal activity and close to a constant supply of fresh, clean water. For best results, place feed in a free-choice protein feeder.

7. Consumption will vary depending upon season of the year, nutritional needs of the animals, availability of other foods and familiarity with pelleted feeds. Deer and elk unaccustomed to eating pelleted feed could require 30-45 days to achieve high intake. To speed this process, blend 75% corn with 25% pellets and gradually eliminate the corn over several weeks as deer accept the pellets.

8. If fed to animals in confinement, feed one to two pounds per 100 pounds of body weight in addition to free-choice, good-quality roughage.

**Important:**

9. A feeding program is only as effective as the management practices. Actual results can vary depending upon feed intake, environmental conditions and the quality of management practices.

10. Purina Mills® AntlerMax® Deer Chow® is a supplement, not a complete feed, and must be fed with free-choice access to adequate hay or native forage.

11. Deer, elk or other game should not have free access to corn as eating too much corn at one time can lead to serious digestive upsets and in extreme cases, even death.

12. Provide water and Purina Mills® AntlerMax® Deer and Elk Trophy Mineral™ (59SF) at all times.

**Caution:**

**Do not feed to sheep!** This product contains copper. Store in a dry, well-ventilated area free from rodents and insects. Never use moldy or insect-infested feed. Regulations for the feeding of big game can vary from state to state. Please check with your local game and fish department for the proper usage of this product.

**Guaranteed Analysis:**

- Crude Protein, not less than 20.0%
- Crude Fat, not less than 2.0%
- Crude Fiber, not more than 13.0%
- Crude Fiber, not less than 11.0%
- Calcium (Ca), not less than 1.25%
- Calcium (Ca), not more than 1.75%
- Phosphorus (P), not less than 1.0%
- Salt (NaCl), not less than 0.2%
- Salt (NaCl), not more than 0.7%

**ANIMAL PROTEIN PRODUCTS-FREE.** Contact your local manufacturing plant for a current feed tag.

**Quality Controlled by Purina Mills® Research**
Purina Mills® AntlerMax® Deer & Elk Trophy Mineral™ 59SF

Designed for the Life of Your Deer and Elk™

What It Is:
A highly researched loose mineral with proprietary AntlerMax® Mineral Technology.
This product is a power-packed nutritional package with ideal amounts and ratios of vitamins and minerals for superior antler density and strength, optimum reproductive performance and healthy calves and fawns.

FEATURES BENEFITS

AntlerMax® Mineral Optimal Antler Growth, Density and Strength Technology
A power-packed nutritional package with ideal amounts and ratios of vitamins and minerals for optimal antler growth, reproductive success and enhanced growth rates.

Research – Formulated Feed With Confidence
Backed by research determining what superior antler and body growth require.
This product provides ingredients of superior biological availability and the proper balance of major trace minerals.

2:1 Calcium/ Balanced For Year-Round Use
Phosphorus Ratio Helps meet the ideal nutritional needs of animals when forage sources are of poor quality.

Easy to Feed Animals Like to Lick Minerals with Salt Off the Ground
Strong Apple Flavor High Palatability
Strong apple flavor attracts deer and elk to the mineral and helps ensure desired consumption.

Vitamin-Fortified Helps Meet Animal Requirements
Contains high levels of Vitamins A, D and E to promote robust health and immune function.

Zinc, Copper, Selenium Helps Produce Strong Healthy Calves and Fawns and Promotes Optimal Antler Development

High Quality Ingredients Optimum Performance
Superior ingredients ensure high feed intake for optimum performance.
Purina Mills® AntlerMax® Deer & Elk Trophy Mineral™ 59SF

Designed for the Life of Your Deer and Elk™

**How and When to Feed:**

13. Feed Purina Mills® AntlerMax® Deer & Elk Trophy Mineral™ to deer, elk and other game year-round as a supplement to help balance nutrient deficiencies that may occur in the natural forage.

14. Feed free-choice as part of a Purina Mills® AntlerMax® Deer Chow® pelleted feeding program along with adequate native forage or good quality hay.

15. Dig a hole in the ground about 4” deep and 24” in diameter next to the Deer Chow® pellet feeder. The hole and pellet feeder should be placed under shelter near high animal activity and close to a constant supply of fresh, clean water. Pour Purina Mills® AntlerMax® Deer & Elk Trophy Mineral™ into the hole where it will form a natural mineral lick. Keep replacing the mineral as animals consume it.

16. Consumption will vary depending upon season of the year, nutritional needs of the animals and availability of other foods. To enhance consumption, do not touch the mineral to avoid leaving human scent on the product.

17. If fed to animals in confinement, this mineral should be fed off the ground in a covered feeder. Mineral supplementation may not be necessary for complete or breeder diets fed to confined deer and elk. Always read the feeding instructions on the feed tag to make sure mineral supplementation is recommended.

**Caution:**

**Do not feed to sheep!** This product contains copper. Store in a dry, well-ventilated area free from rodents and insects. Never use moldy or insect-infested feed. Regulations for the feeding of big game can vary from state to state. Please check with your local game and fish department for the proper usage of this product.

**Guaranteed Analysis:**

- Calcium (Ca), not less than 9.0%
- Calcium (Ca), not more than 11.0%
- Phosphorus (P), not less than 5.0%
- Salt (NaCl), not less than 9.0%
- Salt (NaCl), not more than 11.0%
- Selenium, (Se), not less than 10.0 ppm
- Magnesium (Mg), not less that 1.0%
- Copper (Cu), not less than 500 ppm
- Zinc (Zn), not less than 1,500 ppm
- Vitamin A, not less than 100,000 IU/lb
- Vitamin D, not less than 25,000 IU/lb

ANIMAL PROTEIN PRODUCTS-FREE. Contact your local manufacturing plant for a current feed tag.

**Quality Controlled by Purina Mills® Research**

Plant JDE Number Legacy Code Description
EVAN 0050232 59SF ANTLERMAXDR&ELKTROPHY MN
FORT 0050232 59SF ANTLERMAXDR&ELKTROPHY MN
Purina Mills® AntlerMax® Deer Chow® Block 59SV
Designed for the Life of Your Deer™

What It Is:
A 20%-protein, highly-fortified, year-round supplemental feed block designed to enhance the deer’s natural forage diet without the need for a feeder. This highly palatable, 33-1/3 pound block is not a substitute for a free-choice pelleted feeding program. The high protein content with patented AntlerMax® Protein Technology helps promote good antler growth in bucks, reproductive success and abundant milk production in does and healthy development in fawns. Contains proprietary AntlerMax® Mineral Technology, a power-packed nutritional package with ideal amounts and ratios of vitamins and minerals for superior antler density and strength, optimum reproductive performance and healthy fawns.

FEATURES BENEFITS
AntlerMax® Protein Superior Antler Size and Mass
Technology Helps promotes antler growth by improving protein quality. The unique digestive tract of deer reduces the quality of most proteins by breaking them down too quickly and diluting their value for antler growth. AntlerMax® Protein Technology protects high-quality proteins from early breakdown and delivers a higher concentration to the growing antler.

Develops Exceptional Body Size
High-quality protein helps build muscle for body growth.

Top Reproductive Performance and Strong Healthy Fawns
Provides critical nutrients to help assure top fertility. Helps to increase milk production and milk quality. Helps produce strong, healthy fawns with high survival rates.

Supplements Poor or Sparse Forage
So deer can maintain vigor during periods of environmental nutritional stress.

AntlerMax® Mineral Optimal Antler Growth, Density and Strength
Technology A power-packed nutritional package with ideal amounts and ratios of vitamins and minerals for optimal antler growth, reproductive success and enhanced growth.

Strong Apple Flavor Superior Attractant and High Palatability
Strong apple flavor attracts deer to the block so they receive the benefit of a balanced diet.

High Quality Ingredients Optimum Performance
Superior ingredients ensure high feed intake for optimum performance.

Ready to Use No Feeder Required
Purina Mills® AntlerMax® Deer Chow® Block 59SV

Designed for the Life of Your Deer™

How and When to Feed:

18. Feed Purina Mills® AntlerMax® Deer Chow® Block year-round to deer, elk and other game to supplement poor or sparse forage.

19. Feed free-choice with adequate native forage or good quality hay.

20. Place under shelter near high deer activity and close to a constant supply of fresh, clean water. Consumption will vary with season of the year, nutritional needs of the animals and availability of other foods.

Important:

21. A feeding program is only as effective as the management practices. Actual results can vary depending upon feed intake, environmental conditions and the quality of management practices.

22. Purina Mills® AntlerMax® Deer Chow® Block is a supplement, not a complete feed, and must be fed with freechoice

access to adequate hay or native forage. It is not a replacement for a free-choice pelleted feeding program.

23. Provide water and Purina Mills® AntlerMax® Deer and Elk Trophy Mineral™ (59SF) at all times.

Caution:

Do not feed to sheep! This product contains copper. Store in a dry, well-ventilated area free from rodents and insects. Never use moldy or insect-infested feed. Regulations for the feeding of big game can vary from state to state. Please check with your local game and fish department for the proper usage of this product.

Guaranteed Analysis:

- Crude Protein, not less than 20.00%
- Crude Fat, not less than 1.50%
- Crude Fiber, not more than 8.50%
- Calcium (Ca), not less than 1.80%
- Calcium (Ca), not more than 2.30%
- Phosphorus (P), not less than 0.90%
- Salt (NaCl), not less than 2.75%
- Salt (NaCl), not more than 3.75%
- Vitamin A, not less than 20,000 IU/lb
- Vitamin E, not less than 35.0 ppm

ANIMAL PROTEIN PRODUCTS-FREE. Contact your local manufacturing plant for a current feed tag.

Quality Controlled by Purina® Mills Research

Plant JDE Number Legacy Code Description
EVAN 0050256 59SV Antlermax Deer Block
FORT 0050256 59SV Antlermax Deer Block
SPOK 0050256 59SV Antlermax Deer Block

(Purina Mills, 2008)
## Container Requirements 73

The illustrations shown in this Container Requirement are examples only. Containers that conform to the principle of written guidelines for the species but look slightly different will still meet the IATA standards.

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<thead>
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<td>Antelope species:</td>
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<tr>
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<tr>
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<td>Tamarao</td>
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<tr>
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<td>Banteng</td>
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<td>Eland</td>
<td>Cattle (domestic)</td>
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<td>Goral</td>
<td>Kouprey</td>
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<td>Watussi</td>
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<tr>
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<td>Bactrian deer</td>
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<tr>
<td>Nyala</td>
<td>Bawean deer</td>
</tr>
<tr>
<td>Onib</td>
<td>Calamian deer</td>
</tr>
<tr>
<td>Oryx species</td>
<td>Calamian hog deer</td>
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<tr>
<td>Reedbuck (Southern Mountain)</td>
<td>Canbou</td>
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<tr>
<td>Sassaby</td>
<td>Elk</td>
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<td>Sitatunga</td>
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<td>Takin</td>
<td>Sable Antelope</td>
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<td>Ass species (wild):</td>
<td>Deer species:</td>
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<td>Munjack</td>
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<tr>
<td>Onager</td>
<td></td>
</tr>
</tbody>
</table>

Wild horse species:  
- Przewalski's wild horse
- Zebra
Other species:  
- Alpaca
- Bison
- Camel (small, wild)

STATE VARIATIONS: GBG-01/02/04, LBG-01, SAG-01, USG-Variations
OPERATOR VARIATIONS: CO-04/05/09, QF-01, SV-01, ZA-05/06/07

### 1. Container Construction

#### Materials

Wood or metal and rubber, burlap or canvas for padding and light reduction, if required.

#### Principles of Design

The following principles of design must be met in addition to the General Container Requirements outlined at the beginning of this chapter.

#### Dimension

The height and width of the container must allow the animal to stand erect with its head extended, even if hormed. The size of the container must sufficiently restrict movement so that the animal cannot turn round and in so doing strap or injure itself, nor have space to kick and damage the container.

The dimensions will vary according to the species being shipped.

#### Frame

Must be made of a minimum of 2.5 cm (1 in) solid wood or metal parts, bolted or screwed together.

When the weight of the container plus animal exceeds 60 kg (132 lb), additional metal bracing must be present around the whole container.

#### Sides

Suitable plywood or similar material must closely line the frame to a level slightly above the animal's eye over which there must be a louvered or slatted area for ventilation extending to the roof. The interior must be completely smooth.

#### Floor

The base must be solid and leak-proof, there must be either pegboard or slats bolted to the solid base to give a firm foothold. A droppings tray must be provided under the pegboard or slats to prevent excreta escaping.
Roof
Must be slatted at a width that horns cannot become trapped between the slats. If padding is required, soft material such as shavings can be stuffed under the rubber, canvas, or burlap covering.

Doors
Hinged or sliding entry and exit doors must be provided, they must be fastened in such a way that they cannot be accidentally opened. They must have similar ventilation openings as on the sides. Hinged doors should not be used for equids.

Ventilation
Ventilation louvers or slots, with 2.5 cm (1 in) spacing between the louvers/slats or holes, with a minimum diameter of 2.5 cm (1 in), must be present, above eye level, on all four sides and the roof of close boarded containers. Slots and holes must be covered with a fine wire mesh that will not allow any part of the animal, including horns, to protrude. If the mesh is on the inside of the container all edges must be protected to prevent injury.

Spacer Bars/Handles
Must be made to a depth of 2.5 cm (1 in), and formed from the framework of the container.

Feed and Water Containers
Food and water containers must be provided with outside access from a hinged bolted flap that must be large enough for the entry of a large water dish and/or quantities of appropriate food such as grass hay, roots etc.

Special Requirements
All equids, especially zebra have the tendency to panic, therefore the roof may need to be padded but the sides must remain smooth and not padded, in order to prevent the animal from hurting itself.

Deer species must only be accepted after they have shed their antlers or the hardened antlers have been cut off.

Forklift Extrusions
Must be provided if the total weight of the container plus animal exceeds 60 kg (132 lb).

2. PREPARATIONS BEFORE DISPATCH (see Chapter 5)
Feed normal ration. Do not overfeed.
To avoid risk of damaging the bladder of the male of the bovine or equine species, it is preferable to water the animal not less than two hours prior to loading in the container.

Note:
Large giraffes are not recommended for air transport. For animals that exceed an overall height of approximately 1.50 m (5 ft) see Container Requirement 2.
3. FEEDING AND WATERING GUIDE (for emergency use only)

Animals do not normally require additional feeding or watering during 24 hours following the time of dispatch. Shipper's watering instruction must be followed.

If feeding is required due to an unforeseen delay, fodder must be provided but care must be taken not to overfeed.

4. GENERAL CARE AND LOADING (see Chapters 5 and 10 and 8.1)

It is recommended that polythene sheeting and absorbent material, such as wood shavings, be placed underneath the container and stapled to the sides of the container in order to prevent spillage of excreta.

Some wild-caught animals may require tranquillising for transportation with a long-acting sedative. Some captive bred species will also require tranquillisation. The name of the medication and time of administration must be provided by the shipper and affixed to the container and that information must also accompany the Shipper's Certification.

Notes:

1. Animals listed under Multiple/Single Container may be transported communally in a container such as in Container Requirement 3 which has been suitably reinforced with a steel frame and been provided with a roof or, in the case of non-horned species, a net of suitable dimensions.

2. Antelope species with horns that can damage each other must have plastic or rubber piping placed over their horns. The piping must be removed after shipment.

5. BULK CARRIAGE

Llamas and alpacas are herd animals and can be carried in multiple container but the following guidelines must be followed.

Male llamas will fight when feeding so the multiple container should be divided by partitions up to mid–shoulder level with only 2 or 3 adults per compartment and a maximum of 12 adults per container on a single pallet. The whole group must have been together prior to shipment. A compatible breeding group of 1 male and 5 – 6 females can be shipped together. During the breeding season males and females must be on separate pallets.

Alpacas are gentle animals and out of the breeding season males and females can be shipped together satisfactorily. Compartmentalisation of the container into 2 or 3 compartments is at the discretion of the shipper. There must be no more than 18 adults in a pallet-sized container. If the flight is of long duration they travel better if they are shorn prior to departure.

There must be sufficient space in the container or compartment of the container to allow the animals to lie down.

(International Air Transport Association (IATA), 2006)
Appendix 9.

Australian Government
Australian Quarantine and Inspection Service

RESTRICTION

- Permit Req.
- Health Certification
- Pre-Export Preparations
- Transport Requirements
- Port of Entry Req.
- Health Certificate
- Special Conditions

Country name:
CANADA

Species name:
DEER BREEDER

Transport requirement:
Transport details exist.

Updated:
11 Dec 1998

Protocol Last Negotiated:
JULY 1990

Disclaimer

The information provided in this database is intended for use as guidance only and should not be taken as definitive or exhaustive. The Commonwealth endeavours to keep this database current and accurate, however, it may be subject to change without notice, and exporters should make their own inquiries in relation to import requirements. The Commonwealth will not accept liability for any loss resulting from reliance on information contained in this database.

Permit Requirements:

Agriculture Canada

The original export permit must accompany the deer to Canada and be presented to the Inspector of the Food Production and Inspection Section at the first port of entry. This permit is valid for one shipment only during the period stated on the permit. Any change to the permit by an unauthorized person will render it invalid.

Health certification:

Australia is free for the 12 months immediately preceding the date of exportation from:-
- Hendra virus
- West Nile virus
- Venezuelan equine encephalitis
- Contagious bovine pleuropneumonia
- Rift Valley Fever

There has been no evidence in any animals on the premises of origin or on any other property on which the deer have been maintained of:
- Bovine spongiform encephalopathy
- Disease arising from disease of deer
- Newcastle disease of deer
- Leptospirosis
- Ehrlichiosis
- Other serious infectious and parasitic diseases affecting wild or domestic mammals.

During the previous 7 years no clinical cases have been found in the herd of origin of:
- Foot-and-mouth disease (swine fever)
- Tuberculosis
- Brucellosis
- African swine fever
- Bovine leucosis
- Ehrlichiosis

The deer originate from a herd or herds officially declared free under the Australian Brucellosis and Tuberculosis Eradication Campaign for:
- Tuberculosis
- The herds of origin are tested as described below.

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Pre-Export Preparations:

All animals in the consignment were inspected on the farm of origin within 60 days of entry into pre-export quarantine and all animals on the farm and those for export to Canada were found free from any evidence of infectious or contagious diseases or external parasites.

Immediately following the inspection the deer in the consignment were isolated in an area completely remote from all physical contact with other farm animals in a separate barn, yard or paddock for at least 45 days until moved into the pre-export quarantine.

For deer not from officially tuberculosis declared free herds as described above, the deer must originate from herds which have been free from evidence of tuberculosis for the previous 12 months and must have undergone a whole herd test for tuberculosis using normal saline FPD tuberculin for the single intradermal test, with negative results in each herd according to the Australian Brucellosis and Tuberculosis Eradication Campaign within 6 months immediately preceding the date of tuberculosis tests on the animals for export to Canada. Negative means no increase in skin thickness at the injection site. No deer can be added to the group unless tested for tuberculosis and found negative immediately prior to entry.

All the animals were subjected to the following tests with negative results within 30 days (except for the tuberculosis test as detailed below) of their despatch to Canada and were kept isolated from all other animals from the commencement of testing:
- Tuberculosis by single intradermal tuberculin test using normal saline FPD tuberculin with a negative result meaning no increase in skin thickness at the injection site 60 to 90


30/03/2009
days immediately prior to the date of shipment. Animals to
remain in isolation after testing for tuberculosis.

- Animals by somatic agglutination test (SAT) negative at 1:10
- Pathogenic (Schistosoma digitale) by complement fixation
test (CFT) negative at 1:5
- Animals by agar gel immunodiffusion test (AGID) negative at 1:5 or
  agar gel immunofluorescence test (AGIF)
- Animals by somatic agglutination test (SAT) negative at 1:5 or
  agar gel immunofluorescence test (AGIF)
- CFT for complement fixation test (CFT) negative at 1:5
- Spleen supplemented serum by serum neutralization test (SNT)
  using unaltered virus
- Sericulture by complement fixation test (CFT) negative at 1:5
- Hepatic haemorrhagic disease by complement fixation test
  (CFT) negative at 1:5 or agar gel immunodiffusion test (AGID)
- Any other test for any other disease as may be required by
  the Canadian veterinary authorities

The deer were held in quarantine on a premises designated and approved by the Australian Veterinary Service under the supervision of an official veterinarian of the government of Australia for a period of at least 14 days immediately preceding embarkation to Canada
and during this period were treated for
- internal and external parasites using ivermectin at the
  approved dose rate
- silver flakes (fusidic acid) using a recognised flake
  at the approved dose rate
- intestinal parasites (including those using a recognised
  parasitidal dip or spray 12-15 days after the systemic
  treatment with ivermectin referred to above
- Treatment with dip or spray at a dose rate of 25 mg/kg body weight with an interval of at
  least 14 days.

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**Transportation Requirements:**

The vehicle used to transport the deer to the aircraft and the aircraft for shipping to
Canada were thoroughly cleaned and disinfected along with the animal containers.

The deer must be shipped directly from Australia to Canada unless authorised is
obtained from Agriculture Canada for routing them through another country.

No animals not similarly qualified for Canada are permitted to contact the animals for
shipping to Canada during the shipping of the deer.

**Top**

**Port of Entry Requirements:**

An official health certificate issued by an Authorized Veterinary Officer must accompany
the deer.

On completion of the official quarantine period the veterinary officer in charge of the
approach and the meat provide a certificate to the effect that the deer was held in
an officially approved quarantine station under the supervision of the veterinary
officer for at least the 14 days immediately preceding export and during that time they
remained healthy and free from clinical evidence of any infectious contagious or
parasitic diseases and that all applicable requirements have been met.

The certificate must show that the vehicle used to transport the deer to the aircraft and
the aircraft for shipping to Canada were thoroughly cleaned and disinfected along with

the animal container.

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Health certificate:

PART A HEALTH CERTIFICATION

1. Australia has been free from Boophilus disease, Bovine tuberculosis, Bovine mastitis, Leptospirosis, Mycoplasma bovis, Babesiosis, Trypanosomiasis, Haemophilus aegyptius disease, and Suspected Mycoplasma bovis and Haemophilus aegyptius disease of deer during the 12 months immediately preceding the date of export.

2. There has been no evidence of Campylobacter or Salmonella disease of deer (exempt from this exceptionary) in any wildlife or in any water within the premises or on any other property on which deer have been maintained.

3. No cases of Newcastle disease, Ostrichpox, Newcastle’s disease, Q fever, Ehrlichiosis, Leptospirosis, Babesiosis, Tularaemia, and E. coli disease of deer, or any other serious infectious or contagious diseases affecting wild or domestic animals have existed in the two years on the premises or within 16 km of the premises of origin for a period of 12 months immediately prior to the date of export.

4. During the previous 3 years no clinical cases of Paratyphoid have been found in the herd of origin.

5. There have been no cases of African或 Q fever within a radius of 100 km of the farm of origin during the 12 months immediately preceding the date of export.

6. The deer were born, raised in, and have not at any time been outside the part of Australia described as:
   - Victoria
   - South Australia
   - Tasmania
   - Northern Australia south of 26 degrees south latitude

The deer are permanently and individually identified with distinctively numbered ear tags.

The destinations of the birth of origin and individual identification for each animal are shown on the list attached to this Health Certificate.

7. All animals in the consignment were inspected on their farm of origin within 60 days of entry and were thoroughly examined for evidence of tuberculosis in accordance with the Australian Biosecurity Standards for tuberculosis in cattle and were found free from any evidence of infectious or contagious disease or external parasites.

8. Immediately following this inspection the deer in the consignment were isolated in an area completely removed from all physical contact with other farm animals in a separate yard or paddock for at least 60 days until passed into the post-export quarantine.

9. The deer originate from a herd of herds officially declared free from tuberculosis under the Australian Biosecurity Standards and Tuberuclosis Eradication Campaign.

The deer originate from herds which have been free from evidence of tuberculosis for the previous 12 months, and each herd has undergone a whole herd test for tuberculosis using the standard FPD test in accordance with the Australian Biosecurity Standards and Tuberculosis Eradication Campaign within 6 months immediately preceding the date of tuberculosis tests on animals for export to Canada. Negative results in this test are not indicative of absence of infection.

The following statements are true:

* The animal container is marked with the name of the exporter and the consignment number.
* The consignment is accepted subject to the conditions stated in this Health Certificate.
* The consignment is accepted subject to the conditions stated in this Health Certificate.
* The consignment is accepted subject to the conditions stated in this Health Certificate.

116. The animals were subject to the following tests with negative results within 30 days (except for the temperature test as detailed below) of their departure to Canada and were afterwards free of all other animals from the commencement of testing—

(a) Tuberculin by single cervical intradermal test using bovine vaccine at a site free from decreases in skin thickness at the injection site 15 to 20 days immediately prior to the date of shipment. Animals required no treatment for tuberculosis.

(b) Arbovirus by sero-agglutination test negative at 1:10.

(c) Pneumococcal (Staphylococcus aureus) by complement fixation test (CF) negative at 1:16.

(d) Mycoplasma by agar well immunodiffusion test (AGID).

(e) Thromboembolic disease by anti-platelet antibody by serum neutralisation test (SNT) negative at 1:16 or agar well immunodiffusion test (AGID).

(f) Q Fever by complement fixation test (CF) negative at 1:16.

(g) Moraxella bovocatenabris by serum neutralisation test (SNT) using undiluted serum.

(h) Anaplasmata by complement fixation test (CF) negative at 1:16.

(i) Enzootic haemorrhagic disease by complement fixation test (CF) negative at 1:16 or agar well immunodiffusion test (AGID).

PRE-EMBARKATION QUARANTINE REQUIREMENTS — CERTIFYING BY VETERINARIAN IN CHARGE OF APPROVED QUARANTINE.

1. (INSERT NAME) an official veterinarian of the government of Australia certify that:

1. The deer have been held in quarantine on a premises designated and approved by the Australian Veterinary Services under my supervision for a period of at least 16 days immediately preceding transportation to Canada and during this period, have been fed on:

(a) Intestinal and external parasites using Protosan at the approved dose rate.

(b) Liver fluke (Fasciola hepatica) using a recognised flukicide at the approved dose rate.

(c) External parasites (including ticks) using a recognised parasiticide spray 15-16 days after the systemic treatment with Ivermectin referred to above.

(d) Lice infestation with diatomaceous earth on a dosage of 10 kg per 100 kg body weight with an interval of at least 14 days.

2. During this time they remained healthy and free from clinical evidence of any infectious or parasitic diseases and that all applicable requirements have been met.

3. The vehicle used to transport the deer to the aircraft and the aircraft for shipping to Canada were thoroughly cleaned and disinfected along with the animal containers.

**Top**

**Special conditions:**

CANADA CURRENTLY PROHIBITS THE IMPORTATION OF DEER FROM AUSTRALIA BECAUSE AUSTRALIA IMPORTS DEER FROM NEW ZEALAND AND IS CERTIFIED TO BE FREE OF:

THE FOLLOWING REQUIREMENTS APPLIED BEFORE THE SHIPMENT:

The deer must be born and raised in and not have been outside of the following areas of Australia prior to leaving—

*Victoria*
*South Australia*
*Tasmania*

Western Australia south of 20 degrees south latitude

The deer must be permanently and individually identified with distinctly numbered ear tags which must be listed on the health certificate.


30/03/2009
A 'herd' means a herd which has been in existence for at least 2 years, does for export to Canada must have been born in the herd or have been continually resident in the herd during the preceding 3 years.

Infectious disease is defined as bluetongue, anthrax, rinderpest, bovine malignant catarrhal fever, pseudorabies, mange, & rinderpest, chlamydia, ovine haemorrhagic disease, and all OIE list A diseases.

(Australian Quarantine Inspection Service, 2008)
### MATERIAL SAFETY DATA SHEET

**COMPANY DETAILS**

AUSTRALIAN DISTRIBUTOR:
COMPANY: Chemical Essentials (Pty) Ltd
Address: 13 Abelia Str, Doncaster East, Victoria 3111
Emergency Telephone number:+03 9841 9901
Fax: +03 9841 9909

**MANUFACTURER:**
Health and Hygiene (Pty) Ltd
P O Box 347. Sunninghill 2167, South Africa.
Tel:+27 11 474-1668
Fax: +27 11 474-1670
e-mail: info@healthandhygiene.co.za

### IDENTIFICATION

**PRODUCT NAME:** F10 SUPER CONCENTRATE DISINFECTANT

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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

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### INGREDIENTS

| Benzalkonium Chloride | 68424-85-1 | 5.4% |
| Biguanide | 27083-27-8 | 0.4% |

Ingredients not determined to be hazardous

### 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

<table>
<thead>
<tr>
<th>EXPOSURE LIMITS:</th>
<th>No data found</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering controls:</td>
<td>None required</td>
</tr>
<tr>
<td>PERSONAL PROTECTION:</td>
<td>Not required</td>
</tr>
<tr>
<td>FLAMMABILITY:</td>
<td>Not Flammable</td>
</tr>
</tbody>
</table>

## Safe Handling Information

<table>
<thead>
<tr>
<th>Storage and Transport:</th>
<th>Store below 30°C in dry conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPILLS AND DISPOSAL:</td>
<td>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</td>
</tr>
<tr>
<td>FIRE/EXPLOSION HAZARD:</td>
<td>The product is not flammable or explosive.</td>
</tr>
<tr>
<td>OTHER INFORMATION:</td>
<td>Ensure good industrial hygiene. DO NOT mix with soaps or other chemicals.</td>
</tr>
</tbody>
</table>

**Contact Point:** Managing Director, +03 9841 9901  
Chemical Essentials Pty Ltd

**Keep out of the Reach of Children**

<table>
<thead>
<tr>
<th>Issue number:</th>
<th>2</th>
</tr>
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<tr>
<td>Issue Date:</td>
<td>August 2004</td>
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</tbody>
</table>
Appendix 11

Members of the Hog deer Management Strategy Subcommittee

- **Sebastian Ziccone (Chairman):** Holds a Masters Degree in Physiology and is currently involved with the oversight and management of research in obstetrics at a major teaching hospital. Sebastian was the immediate past President of the SSAA (Vic.) and has extensive experience in administration of shooting and hunting organisations and the management of personnel and departments.

- **Otto Ruf:** Recently deceased. Thirty years involvement in policy development at Branch, State and National levels with the Australian Deer Association Inc. Otto had over fifty years hunting experience worldwide, including Germany, Australia, Africa, Hungary, New Zealand, New Caledonia and Mongolia.

- **Darrell Gascoyne:** Former member of the Victorian Hunting Advisory Committee for five years, deer hunter for over fifteen years, background in business management and compliance. Darrel has held former executive positions in the ADA at local, State and National levels.

- **Helen Dixon:** Holds a Bachelor Degree in Applied Sciences, majoring in biological resources management. Helen is currently the Chief Ranger, West Gippsland District, Parks Victoria and has over eighteen years experience with a strong background in environmental management, strategy and management plan development.

- **Simon Toop:** Holds a Bachelor of Applied Science Degree, Honours Degree in Biological and Chemical Sciences and an Executive Masters degree in Public Administration. Simon worked in the Department of Sustainability and Environment Game Management Unit for six years, five of these years as Project Leader. Simon was the Manager of the Flora and Fauna Utilisation and Management section for three years, which included Game Management and now is the Director, Major Projects and Environmental Approvals, DSE.

- **Charlie Franken:** Manager, Flora & Fauna Utilisation and Management, DSE Gippsland. Charlie has over 27 years experience in wildlife compliance and management and is a member of the Blond Bay Hog Deer Advisory Group and coordinator of the ballot since 1994.

- **David Young:** Thirty-three years of involvement in hog deer management projects. David has been involved in projects conducted at Snake Island and Sunday Island and has been the Co-ordinator and Secretary of Blond Bay and Boole Poole balloted hunting. David was a hog deer Checking Station Operator on behalf of DSE for ten years. He is the member of the Sunday Island Game Management Panel and acts as the hunt master of over 100 hunter members. He is also the Co-ordinator of the Sunday Island Junior Hunter Program.

(Draft Hog deer Management Strategy 2008)
Appendix 12

Approved Terms of Reference

Develop a management strategy for hog deer in Victoria that:

● ensures a viable population throughout its current range and that its presence is managed according to land tenure objectives

● provides for sustainable, quality hog deer hunting opportunities on areas where the activity is consistent with land reservation status

● considers improvements and efficiencies to current management practices for hog deer hunting throughout the current range

● improves opportunities on private land, in order to strengthen relations between landowners and hunters, encourage improved access to hunting, and educate and encourage landowners to provide quality habitat for hog deer

(Draft Hog deer Management Strategy 2008)
Figure 2. The location and estimated size of recognised Hog Deer populations in Victoria (MapShare - Internet Mapping Framework, DSE June 2006).