

Husbandry Manual for Fijian Crested Iguana *Brachylophus vitiensis*



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Cover photograph by
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2 Introduction

It is of great concern that since its scientific discovery in 1979 the wild population of the Fijian Crested Iguana (*Brachylophus vitiensis*) is continuing to rapidly decline.

Unlike its closest relative the Banded Iguana (*B. fasciatus*) with a distribution that spans Fiji and Tonga, the more robust crested iguana is found only in Fiji, and holds an IUCN Red List category of Critically Endangered.

The only secure wild population of crested iguanas is on the island of Yadua Taba, which was declared a wildlife sanctuary by the National Trust of Fiji in 1980.

Since 2000, with the co-operation from the National Trust of Fiji, Taronga Zoo's Dr Peter Harlow has been undertaking research on this species. He and his team have been carrying out a series of field studies on Yadua Taba and many islands in the Yasawa and Mamanuca groups, researching diet, habitat and species abundance.

Of 17 islands surveyed, crested iguanas were found on only four of them. In 2003 he and his team resurveyed two of those islands and found that the populations were continuing to decrease. All islands surveyed had free ranging goats, forest fires and exotic predators.

Immediate intervention is required, and Dr Harlow has made recommendations to the Fiji Government to establish a further two wildlife sanctuaries in the Yasawa and Mamanuca island groups (Harlow et al 2006).

Yadua Taba holds 98% of the world's wild population of crested iguanas.

The largest captive colony is in Kula Eco Park, Fiji, and along with its contribution to research and conservation, Kula has developed an environmental education program for the children of Fiji.

Ongoing scientific field studies of this species are crucial in providing findings that will ensure its return to a successful and abundant wild population.

Institutions such as Kula Eco Park and Taronga Zoo hold key roles in ensuring that research and conservation on this species continue, and that public education of this species' predicament is increased.

3 Taxonomy

3.1 Nomenclature

Class	Reptilia
Order	Squamata
Family	Iguanidae
Genus	<i>Brachylophus</i>
Species	<i>vitienis</i> (Gibbons, 1981)

3.2 Subspecies

Preliminary evidence indicates there are no subspecies of Fijian Crested Iguana.

Taronga Zoo has undertaken a study of the relationships of wild populations between three Fiji Islands. These wild populations were sampled by extracting DNA from sloughed skin, and the results indicate that each island population shows very little variation. Individuals are closely related, possibly descended from one female ancestor.

Although the three island populations are different to each other, geneticists do not regard these differences as large enough to consider them subspecies.

Study using other types of DNA called microsattelites will expand our understanding of this genetic variability. Five microsattelites were isolated from the Fijian Crested Iguana using enrichment technique. All five loci were polymorphic with between 2-7 and 4-7 alleles per locus in *Brachylophus vitiensis* and *Brachylophus fasciatus* respectively. Heterozygosity (Ho) values ranged from 0.069 to 0.875. These markers were useful in resolving kinship relationships and will aid future endeavours by the captive management program to conserve genetic diversity (Burns et al, 2006),

3.3 Recent Synonyms

There are no known synonyms. (P. Harlow, pers. comm.)

3.4 Other Common Names

The Fijian Crested Iguana is also known as Vokai or Samuri, but in Fiji only.

(Anon in www.icffci.com/page7.htm, March 2006)

4 Natural History

4.1 Morphometrics

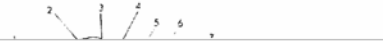
Refer to Fig. 1 for parts of the Iguana.

The Crest

Both males and females have vertebral crests, a row of enlarged, pointed scales along the spine, beginning at the head and decreasing in size down to the tail.

The crest is larger and more pronounced in the males, and makes them look larger to their opponents. (Other iguanids that lack the crest, such as chuckwalla, inflate themselves with air to increase their size.)

The parts of the iguana:



(Bartlett et al, 1995)

Fig. 1

The Dewlap

All iguanas bear a dewlap, a fold of skin under the throat that is displayed in courtship and territorial behaviours.

The Parietal Eye

Between and posterior to the eyes on the top of the head, is a small grayish organ that looks like a modified scale. This is the parietal eye, which is sensitive to light and dark cycles (photoperiod) and so aids the timing of the breeding cycle. (Bartlett et al, 1995)

4.1.1 Mass And Basic Body Measurements

In their studies Gibbons and Watkins (1982) recorded the following measurements:

<u>Adult Weight (grams)</u>		<u>Mean Range</u>
Males	95 – 207	162
Females	105 – 172	123
<u>Adult Snout/Vent Length (cms)</u>		<u>Mean Range</u>
Males	13.6 – 19.3	16.6
Females	13.4 – 18.4	15.7

4.1.2 Sexual Dimorphism

In their 1982 findings Gibbons and Watkins suggested that sexual dimorphism is not displayed in this species and that males are determined by their larger femoral pores.

Experienced zookeepers find that sexual dimorphism *is* displayed by individual variations in body form and shape (M. Guy, pers.comm.), and that the males head is slightly larger than the females at the same body length. (P. Harlow, pers.comm.)

The diagram (Fig. 2) shows the proportionately larger femoral pores than those of the female.



Femoral pores of a male crested iguana at Taronga Zoo.
(Photo Deirdre Reidpath, 2006)

(Bartlet et al, 1995)
Fig. 2

4.1.3 Distinguishing Features

The Fijian Crested Iguanas closest relative is the Pacific Banded Iguana (*Brachylophus fasciatus*) with a distribution that spans the Fiji and Tongan Islands.

The crested iguana is more robust with a large square dewlap that is almost twice the size of a Banded Iguanas.

The bands are white, bordered by dark pigment, and approximately 1cm narrower than the Banded Iguanas, which are wide and pale blue or white.

The ventral pattern is green mottling rather than the solid light



Black colouring
(Photo by Paul Kirk in
www.icffci.com May 2006)



Crested
(Photo by Paul Kirk in
www.icffci.com May 2006)

green of the Banded Iguana.
(Kinkaid J. 2006)

Crested Iguanas have distinct crest spines along the back which can be between 1.2cm and 1.5cm long. (Gibbons & Watkins, 1982)

Unlike the Banded Iguana, crested iguanas have the ability to change colour rapidly from green to black in less than 5 minutes. Reversal takes longer. The colour change occurs when the animal becomes aroused for any reason. During the colour change the dewlap lowers and the crest spines become erect (Anon in www.icffci.com).



Banded Iguana

(Photo by Bill Beckon in www.icffci.com May 2006)

4.2 Distribution and Habitat

Wild populations of the Fijian Crested Iguana are restricted to the North-West Fiji Islands of Yadua Tabu, Monoriki and the Mamanuca group and several in the Yasawa group. (Fig. 3)

Yadua Tabu is the stronghold for the species, and contains approximately 98% of all individuals – estimated to be 6,000 animals.

These islands are dry rainshadow islands that receive most of their 160-180cm of annual rainfall during the hurricane season and have a distinct dry period between May and September (Gibbons, 1984)

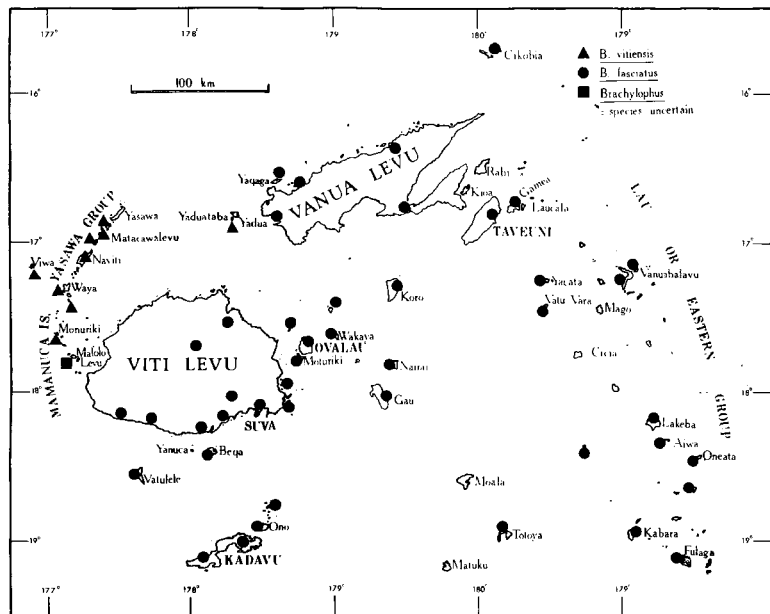


Figure 1. Map of the Fiji Islands showing the distribution of the banded iguana *Brachylophus fasciatus* and the crested iguana *B. vitiensis*.

(from Gibbons, 1984)

Fig. 3

An uninhabited volcanic island, Yadua Taba has four distinct vegetation types:-

- coastal strand (beach/littoral)
- rocky cliff
- dry forest
- grass and shrubland.

(www.apscience.org.au 2006)

See Fig. 4.

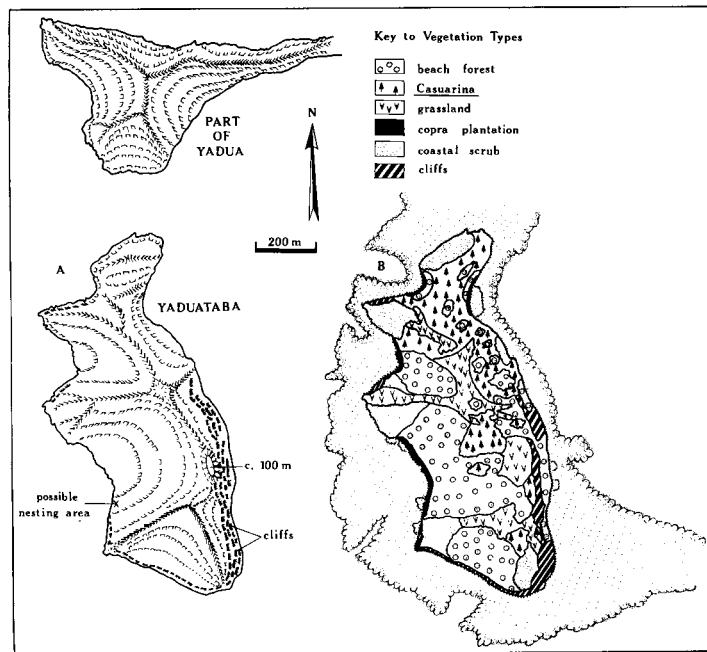


Figure 2. (A) Yaduataba in relation to Yadua showing rough detail of slopes and ridges. (B) Vegetation map of Yaduataba showing areas of coral reef surrounding the island. Drawn from aerial photographs.

(from Gibbons, 1984)

Fig. 4

4.3 Conservation Status

IUCN Category	: CR A1c, B1 + 2c www.redlist.org [April 2006]
CITES Category	: Appendix 1 www.cites.org [April 2006]
ASMP Category	: 1a
OH & S Category	: Harmless
Wild Population Management	: National Trust of Fiji
Species Co-ordinator/Studbook holder	: Dr Peter Harlow, Taronga Zoo Australia pharlow@zoo.nsw.gov.au

(See Appendix 1 for ASMP information on this species)

4.4 Diet in the Wild

This species will eat only certain plants, leaves, fruit and flowers (Harlow and Biciloa in <http://www.icffci.com>, March 2006).

As a result of studies conducted between 1998 and 2003 Peter Harlow and his team identified an additional three food tree species to the four already identified by Gibbons (1984). These seven tree species and their Fijian names are:

Cevua *Vavaea amicorum*

Yaqata *Mallotus tilifolius*

Kau Loa *Diospyros insularis*

Vau *Hibiscus tiliaceus*

Moivi *Kingiodendron platycarpum*

Cibicibi *Cynometra insularis*

Vesiwai *Pongamia pinnata*

(Harlow et al, 2006)

Iguana droppings were also collected and studied under microscope. No insect remains were found suggesting this species is entirely herbivorous (Harlow and Biciloa in www.icffci.com, March 2006), although in captivity young crested Iguanas have been known to eat insects. (Harlow, Biciloa in www.icffci.com, March 2006)

There is very little freshwater in the natural habitat. The coastal forest areas get covered in salt from wind/sea spray, and, like all the iguanas this species has the ability to 'sneeze' excess salt from their bodies through their nostrils.

4.5 Longevity

4.5.1 In the Wild

No data available.

4.5.2 In Captivity

In his ASMP draft Terry Boylan (1993) noted that a specimen which had hatched in captivity in 1979 was still alive in 1993.

4.5.3 Techniques Used to Determine Age in Adults

There are no techniques used to determine age in adult crested iguanas. The history of the animal must be known in order to determine age. (P. Harlow pers. comm.)

5 Housing Requirements

5.1 Exhibit/Enclosure Design

The two most important considerations for the Fijian Crested Iguanas exhibit or enclosure are access to UV emitting lights, natural light/sunlight, and spatial requirements.

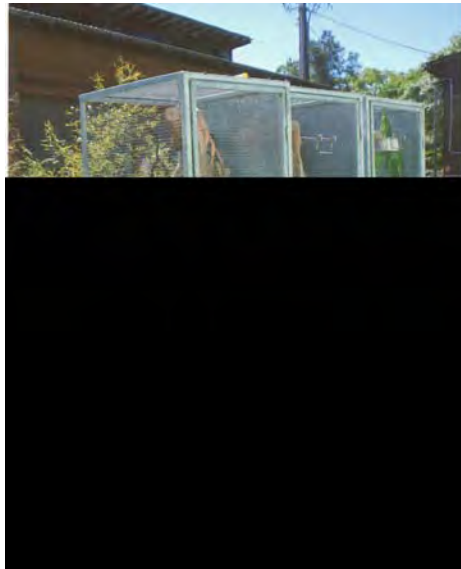
Male Crested Iguanas are highly territorial and must be separated not only spatially but visually. The only exception to this rule would be when stimulus is needed to prompt males into coitus with females (Boylan, 1996).

5.2 Holding Area Design

At Taronga Zoo the off-exhibit Crested Iguanas are held in mobile holding cages in an area that has outdoor accessibility. These cage dimensions are 160cm tall x 50cm wide x 70cm deep, and this cage is suitable for one animal. The cage sits on a removable base fitted with casters.

The cage structure is a metal frame with its floor and three sides covered with small gauge wire mesh. One side of the cage is sheet metal, which is essential to ensure the iguanas, when held in adjoining cages, cannot see each other. This prevents unnecessary aggression between the animals.

The door locking mechanism is a latch and padlock.



After its mobile holding cage was positioned outdoors in sunlight, this male Crested Iguana is changing colour from green to black.

Photos by Deirdre Reidpath 2006

The holding cage furnishings should include leaf litter, palm fronds and branches in both vertical and horizontal positions. A soil pot at least 25 cm deep should be placed in the cage during breeding time to allow the female to oviposit.

When indoors the holding room temperature is approximately 26-30°C, and a 300 watt UV globe suspended above the top of the cage provides a basking temperature of 35-40°C.

During days where there is a sunshine and air temperature of no less than 25° the cages are wheeled outside to enable the iguanas to bask in natural sunlight. It is beneficial for the iguanas to receive this natural sunlight for as long as the temperature allows (S. Kozlowski and M. McFadden pers. comm.)

5.3 Spatial Requirements

Taronga Zoo's exhibit for this species measures approximately 2.2 m wide x 2.2 m high x 1.7 m deep. (See Appendix 2.)

It is essential that males must be separated not only spatially but visually to prevent aggression and agitation (Boylan, 1996).

Visit www.legislation.nsw.gov.au to view the minimum standards for animals in captivity in NSW. The regulations can be found under the Exhibited Animals Protection Act 1985.

5.4 Position of Enclosures

The Crested Iguana enclosure must be designed to ensure the animal has access to natural UV light/sunlight (pers. obs.) Sunlight exposure is crucial in avoiding metabolic bone disease associated with calcium and Vitamin D deficiencies (Boylan, 1996).

At Taronga Zoo the exhibit has been positioned in an area beneath a cone-shaped glass roof, which provides the animal with natural light and photo periods (pers. obs.)

5.5 Weather Protection

The exhibit or enclosure must be designed to duplicate the iguana's natural habitat. This would include exhibit furniture and foliage which would provide sufficient shelter if the exhibit is outdoors (pers. obs.)

5.6 Temperature Requirements

Iguanas require UV-B (ultra-violet radiation in the 'B' range) to allow the photochemical process involved in metabolizing vitamin D3, which mediates calcium absorption.

Biologically active vitamin D3 is stored in the liver and kidneys and its primary function is to regulate calcium metabolism. Reptiles suffering from metabolic bone disease (lack of sufficient D3 to metabolise calcium) may also suffer from forms of liver and kidney disease.

The UV range is from 180-400 nm, the B range specifically from 280-320 nm.

The D-UV range which is responsible for creating pre-vitamin D3 (cholecalciferol) is from 290-300 nm.

Two styles of reptile UV-B bulbs are available. One is the fluorescent tube and the other is the mercury vapour (MV) reptile lamp (MacCarger, 2003).

Taronga Zoo uses Osram 300 w UV-B globe in its exhibit. (See Appendix 3) UV-B readings are taken with a solarmeter Model 6.2UVB UW/cm² digital ultraviolet radiometer. (See Appendix 4)

Eight to twelve hours of UV-B per day is recommended (comparable to minimal natural exposures in the wild) (MacCargar, 2003).

The Taronga Zoo exhibit has temperatures that fluctuate between night time lows of 22-24°C and daytime highs of 28-35°C. Two basking sites are provided by suspended carbon filament 60W heat bulbs creating a basking site temperature of 38°C (Boylan 1996).

5.7 Substrate

Substrate should be soil or soil/sand mix.

During breeding, to enable the female to oviposit the substrate should be a depth of 10 cm to 35 cm (Boylan, 1996). During her egg data study of captive individuals, Carol Bach (1998) recorded one egg in sand substrate at a depth of 15 cm. Captive females have also been known to lay their eggs on top of soil substrate, on the surface of the cage floor, and between the wall of an enclosure and a log.

5.8 Nestboxes and/or Bedding Material

See 5.7 for nesting/laying requirements.

The Fijian Crested Iguana is arboreal and sleeps exposed on tree branches.

5.9 Enclosure Furnishings

As the Crested Iguana is arboreal strong horizontal and vertical branches must be positioned in the exhibit. Foliage can be a mixture of live and artificial, along with fresh cut branches and palm fronds.

A strong horizontal branch should be positioned as a basking site to allow the iguana access to both natural sunlight and basking lamps.

A soil or sand/soil substrate should be included if the enclosure is indoors.

Taronga Zoo's exhibit comprises a rock pond with a small waterfall providing free flowing water and palm tree trunks positioned at various angles. A strong branch is positioned beneath heat bulbs to provide a basking site. Live plants are in the exhibit, as well as cut palm fronds ranging from fresh cut to dried. To view this exhibit see Appendix 2.

6 General Husbandry

6.1 Hygiene and Cleaning

Daily Routine

Spot clean exhibit. Remove faeces and any uneaten food. If a pond is a feature in the exhibit remove any debris from the surface and bottom of pond. Spray foliage with hand demister, and water live plants. Chemicals are not used in the daily routine (Boylan, 1996 and pers. obs.)

Branches

Cleaning of branches is not usually necessary as animals will position their cloacas over the side of a branch when defecating. (Boylan, 1996) When a branch starts to lose its aesthetic quality replace it with a new branch. (M. Guy pers. comm. and pers. obs.)

Substrate

Substrate should be sand/soil mix and should be changed on a regular basis, or when required. Egg laying sites (pots etc.) should not be disturbed unless spoiled by food or faeces (Boylan, 1996).

Pond

Pond water should be drained and refilled once a week, or as required.

If green algae growth builds up, a very dilute solution of bleach may be used. Ensure the bleach solution has been thoroughly washed off before refilling. (M. Guy pers. comm.) It is advisable to remove animal from the exhibit before this cleaning process, and return animal to the exhibit only when all bleach fumes have dissipated (pers. obs.) (Refer to Appendix 5 for bleach MSDS)

Food Bowls

Divermite should be sprayed on food bowls/dishes during the washing process (pers. obs.) (Refer to Appendix 6 for Divermite MSDS)

Personal Hygiene

Follow a personal hygiene routine by washing hands before and after handling animals, and follow the institution's OH&S procedures.

6.2 Record Keeping

Daily diary/daily reports are kept to record details such as:- growth – length/weight; faecal samples; injuries; medical checks; medication; births; deaths; enclosure or holding cage transfers; feed records; unusual or abnormal behaviours.

Information is then transferred to the ARKS computer recording system. Veterinarians will transfer medical data into MEDARKS.

Cage cards are also used to record this information, and whiteboards can also be used as a form of immediate reference, for instance, medication information.

6.3 *Methods of Identification*

Microchipping and photo identification are the methods of identification Adelaide Zoo use with their Crested Iguanas. (M. Guy, pers. comm.)

Microchip

The animals are usually microchipped in the inguinal region in front of the left hind leg. (P. Harlow pers. comm.)

Photo Identification

The stripe pattern is unique to each iguana (P. Harlow pers. comm.)

6.4 *Routine Data Collection*

Observations of the iguana are a part of the daily routine, and should be recorded in the institution's data collection records. These observations would include any changes in behaviour, unusual or abnormal behaviour; reproduction and breeding behaviours; feeding notes and observations, different interactions between animals. (M. Guy pers. comm..)

7 Feeding Requirements

7.1 *Captive Diet*

The Crested Iguana is herbivorous with a diet consisting of leafy vegetables, greens and fruits.

Taronga Zoo in NSW and Adelaide Zoo in South Australia follow successful diet plans offering iguanas a mix of vegetables, greens and fruits three days a week. The full diet plans from both zoos can be viewed in Appendix 7.

In captivity young crested iguanas have been known to eat insects (Harlow and Biciloa, 2006) and in the past Taronga Zoo iguanas have eaten silkworms and cocoons (Boylan, 2006).

The captive diet is constant and any changes to the diet will be decided by keeping staff, after discussion with veterinarians.

Females tend towards obesity in captivity resulting from lack of exercise, coupled with frequent feeding. It may be necessary to temporarily remove females sharing enclosures with males during feeding to prevent them overeating (Boylan, 1996).

Clean water should be available at all times.

7.2 *Supplements*

Even with a well rounded diet it may be beneficial to enhance an iguana diet with occasional vitamin and mineral supplements.

Both Taronga and Adelaide zoos sprinkle vitamin and calcium supplements over the food. (Refer to Appendix 7 for specific menu dosage).

The supplements they use are as follows:

Rep-Cal Phosphorous-free CALCIUM with VIT. D3

Rep-Cal HERPTIVITE with Beta Carotene 'Multivitamin powder'

Manufactured by Rep-Call Research Labs

<http://www.repcal.com>

7.3 *Presentation of Food*

The food can be placed into/onto various types of dishes, bowls, or natural vegetation, such as hollow coconut shells. These food containers can be attached to branches or placed on the ground.

Kula Eco Park in Fiji also scatters hibiscus leaves and flowers in the exhibit to encourage natural eating behaviour. (P. Felstead pers. comm..)

As an arboreal reptile, crested iguanas will prefer to drink from foliage. Spray water onto foliage and branches as a form of behavioural enrichment (Boylan, 1996).

8 Handling and Transport

8.1 Timing of Capture and Handling

In the wild the length of transport is important. It should be kept to a minimum and the iguana should be in a well ventilated, cool and dark enclosure with something they can ‘cling’ on to; for example, a tree branch (P. Felstead pers. comm.).

8.2 Catching Bags

Catching bags are not required. (P. Harlow pers. comm..)

8.3 Capture and Restraint Techniques

Crested iguanas are quite docile but individuals can show aggression with occasional displays of tail whipping and rarely, biting.

To handle an iguana position one hand at the base of the tail (at the hind legs) and the other hand at the shoulder behind the head. Most iguanas will typically walk on to a hand placed in front of them if the other hand is placed at the tail first.

Care should be taken when detaching them from any material they are clinging to as this will avoid nail or digit damage. (P. Felstead pers. comm..)

8.4 Weighing and Examination

Weighing and examination of the iguanas is generally not carried out at the site of capture (T. Boylan pers. comm.).

8.5 Release

Follow the handling technique noted in 8.3 when the iguana is ready to be transferred from holding box to exhibit or enclosure.

8.6 Transport Requirements

Refer to Appendix 8 for IATA container requirements, and Appendix 9 for CITES Packers guidelines.

In 2001 Auckland Zoo in New Zealand made an application to import the Fijian Crested Iguana. The containment controls in regards to this application can be found in Appendix 10.

8.6.1 Box Design

Refer to Appendices 8 and 9.

Kula Eco Park in Fiji uses ‘cat transporter’ type cages. (P. Felstead pers. comm..)

8.6.2 Furnishings

Kula Eco Park fills its 'cat transporter' cages with fresh branches and leaves for cover. Leaf and branch cover to hide in makes the transport less stressful (P. Felstead pers. comm.).

The transport box could also be lined with dry sphagnum moss which would act as a "shock absorber" (Boylan, 1996).

8.6.3 Water and Food

Food and water are not required if the trip is a matter of a few days. Water-misted leaves in the box provide sufficient moisture. (P. Felstead pers. comm..)

8.6.4 Animals per Box

One animal per box is best but females can be combined depending on box size.

Males should always be separate from any other sex. (P. Felstead pers. comm..)

8.6.5 Timing of Transportation

See 8.1

8.6.6 Release from Box

See 8.5 Release

9 Health Requirements

9.1 Daily Health Checks

Refer to 6.4 Routine Data Collection for some observations.

Knowing the iguanas behaviour(s) is important when assessing its condition. The location of an animal within the exhibit may be a clue to what is normal and abnormal behaviour. A lack of appetite is an indication that something may be wrong with the animal. Another indicator is a possible change of colour associated with its attitude and behaviour. (M. Guy pers. comm.)

9.2 Detailed Physical Examination

9.2.1 Chemical Restraint

Chemical restraint is not required for a physical examination. (P. Felstead pers. comm.)

9.2.2 Physical Examination

Weight, snout-vent length (SVL) length and general condition is part of a typical examination. (P. Felstead pers. comm.)

The mouth is checked for dentition problems, and palpation of the body to check for unusual lumps. (M. Guy pers. comm.)

A veterinary check may include taking a blood sample for blood chemical testing. (pers. obs.)

9.3 Routine Treatments

Faecal samples are normally collected once every six months. Microbiologists will examine the samples for endoparasites or signs of the presence of pathogens. Treatments will only be administered on veterinary advice (Boylan, 1996).

9.4 Known Health Problems

Gravid females

Should be carefully monitored by vets and any problems in ovipositing dealt with accordingly. Egg binding has been treated by the administration of glucose, oxytocin and calcium gluconate, but may require surgery if this treatment is ineffectual (Boylan, 1996).

Kula Eco Park has recorded two individuals with *wart-like growths* on their face. They were isolated from the collection and the warts were cleaned and treated with iodine. It took a period of four weeks for the warts to shrink and disappear. (P. Felstead pers. comm.)

At Taronga Zoo in Sydney *minor health problems* have included a hemi-penal prolapse in a young male; dry gangrene on the tail tip of an adult female; and tail tips and claws caught in the minute space where wire mesh adjoins metal fixtures in holding cages.

Faecal sampling

This has shown the presence of the following endoparasites:

trichomonads – treated with Panacur

strongyloides – treated with Panacur

ascarids – treated with Panacur

oxyurids – treated with Panacur

entamoeba – treated with flagl

(Boylan, 1996)

Vitamin D deficiency

This can occur as the result of poor diet, and low exposure to UV-B through natural sunlight or lack of artificial UVB lighting.

Refer to 5.6 Temperature Requirements and further readings listed in References.

Known diseases

Refer to 5.6 Temperature requirements.

9.5 Quarantine Requirements

At Taronga Zoo newly arrived animals undergo quarantine until three faecal samples taken over a month have tested negative (Boylan, 1996).

To view the importation controls regarding New Zealand's application to import the Fijian crested iguana refer to Appenxix 10.

10 Behaviour

10.1 Activity

At Kula Eco Park males are housed individually and females in groups.

Males hide in fresh foliage (provided daily) and come out of hiding to sit in patches of sunlight, gaining warmth and absorbing UV. During the basking they change colour to almost black.

Females do the same, but are willing to share logs while basking in the sun. (P. Felstead pers. comm..)

10.2 Social Behaviour

There is no known vocalisation but Crested Iguanas are known to make a hissing type noise when startled.

At Kula Eco Park head-bobbing occurs daily in female groups as they move around and intrude into each other's space.

Both sexes will go almost black if angry and will aggressively head-bob. (P. Felstead pers.comm.)

10.3 Reproductive Behaviour

Males in sight of other males, even in separate enclosures up to 20 metres apart, will go black and become stressed. They are extremely territorial and rarely tolerate the sight of another without attacking. (P. Felstead pers. comm.)

Females do not display this aggression to each other (P. Felstead pers. comm.) but female to female aggression has been observed during the breeding season where one female was chasing and biting the other (Boylan, 1989).

During confrontations it has been observed that the females underwent colour change to almost black, their nuchal humps and dorsal crests became enlarged, throat sacs expanded with a noticeable increase in sagittal crest size (Boylan, 1996).

10.4 Bathing

The Crested Iguana does not have a bathing regime and generally will not tolerate being sprayed with water. (pers. obs)

10.5 Behavioural Problems

Refer to 10.2 and 10.3.

10.6 Signs of Stress

A good indicator of stress is the colour change to almost black, even when there is no sunlight in the enclosure or exhibit. (P. Felstead pers. comm.)

10.7 Behavioural Enrichment

Water sprayed on foliage and branches encourages the iguana to drink as it would in the wild. (pers. obs.)

Scattering food in the enclosure encourages natural eating behaviour. Fresh hibiscus leaves with flowers and shoots and other fruit and vegetables that have been roughly torn or chopped provide further enrichment. (M. Guy, P. Felstead pers. comm.)

Exhibit or enclosure furnishings such as vertical and horizontal branches for climbing and branches/logs positioned for basking/sunning also provide natural behavioural activities. (pers. obs.)

10.8 Introductions and Removals

Never place males with males.

Problems rarely occur when placing females together, but it is recommended they be observed for the first 24 hours (P. Felstead pers. comm.).

During breeding, aggression has been observed between two females where one was chasing and biting the other. In this instance they were separated (Boylan, 1988).

10.9 Intraspecific Compatibility

Refer to 10.8

10.10 Interspecific Compatibility

Male Crested Iguanas could be housed with medium sized non-carnivorous lizards and turtles (P. Harlow pers. comm.) Female crested iguanas could be housed with female banded iguanas (P. Felstead pers. comm.)

Avoiding hybridisation is a key factor when considering mixed species exhibits (G. Harris pers. comm.).

10.11 Suitability to Captivity

As long as the husbandry guidelines are followed this animal adapts well to captivity (P. Harlow pers. comm.)

11 Breeding

11.1 Mating System

Males will communicate to females by head bobbing but of a different speed and duration to signify readiness to mate. Females will reciprocate in a similar fashion.

Close encounters will include touching bodies with tongues before the females are grasped by the males.

In captivity copulation occurs on the ground. The male grasps the female's nuchal hump in his jaws, and the female raises her tail to allow juxtaposition of cloacas. (See Fig. 5)

Coition has been observed lasting from three to twenty minutes (Boylan, 1996).



Fig. 5
(Boylan, 1989)

Plate 1. Mating Fijian crested iguana *Brachylophus vitiensis* pair, 'Fiji male' and ♀A, at Taronga Zoo, Sydney.
Paul Kirk.

11.2 Ease of Breeding

See 11.6

11.3 Reproductive Condition

11.3.1 Females

In captivity sexual maturity is reached at approximately 18 months (Boylan, 1996).

Once the female is gravid place her and the selected male into an isolated holding cage. After two weeks remove the male and provide a container of soil for the female to oviposit (M. Guy pers. comm.).

11.3.2 Males

Sexual maturity is reached at approximately 18 months (Boylan, 1996).

11.4 Techniques Used to Control Breeding

Males and females are kept apart.

11.5 Occurrence of Hybrids

Institutions avoid the occurrence of hybrids by housing only same species together (G. Harris pers. comm.).

11.6 Timing of Breeding

In the wild breeding occurs for hatching to coincide with the rainy season, which is between December and March (P. Felstead pers. comm.).

Taronga Zoo records show that egg laying of both fertile and infertile eggs has occurred in the following months: Feb (2 occasions), March (5 occasions), April (5 occasions), May (once), June (3 occasions), July (5 occasions), August (once), Sept (3 occasions), Oct (once), and Dec (once), (Boylan 1996).

11.7 Age at First Breeding and Last Breeding

No data available.

11.8 Ability to Breed Every Year

See 10.6

A genealogy chart of iguanas spanning a period of 13 years can be viewed in Appendix 11 (Boylan, 1993)

11.9 Ability to Breed More than Once Per Year

See 10.6 and view Appendix 11.

11.10 Nesting, Hollow or Other Requirements

Supply the female with a container of soil or soil/sand mix with a depth of between 25 cm to 35 cm to allow her to oviposit (Boylan, 1996).

11.11 Breeding Diet

Same as 6.1 Captive Diet with changes made only on veterinarian's recommendations.

11.12 Incubation Period

Studies of the Taronga Zoo clutches (10.6) found that the incubation period averaged 198 days, with a wide range of 139 to 282 days depending on incubating temperature (Bach, 1998).

11.13 Clutch Size

Crested Iguana eggs are white and leathery. When first laid each one is about 3-4cm long, but as they gradually absorb moisture from the soil they soon swell to the size of a ping pong ball (www.icffci.com.2006)

In the wild females can lay between 1-6 eggs with an average of 4 (Harlow and Biciloa, 2006). In captivity females can lay between 1-5 eggs (Boylan 1996).



11.14 Age at Weaning

Weaning is not required with this species – hatchlings to juveniles eat the same food as adults (Boylan 1996).

11.15 Age of Removal from Parents

Juveniles are independent of parents (Boylan 1996).



(Photo Paul Kirk in www.icffci.com 2006)

11.16 Growth and Development

At Taronga Zoo five juveniles hatched in 1987 had the following average weights and measurements.

At hatching: S/V 73.4 mm; tail 169.2 mm
Weight 11.08 gm

At 12 months: S/V 110 mm; tail 262 mm
Weight 48 gm

The growth and development of the four remaining in 1989 and 1991 is as follows:

1989 S/V 182 mm; tail 420 mm
Weight 196 gm

1991 S/V 190 mm; tail 445 mm
Weight 249 gm

The growth and development of two remaining in 1995 is as follows:

Male S/V 200 mm; tail 444 mm
Weight 293 gm

Male S/V 215 mm; tail 382 mm
Weight 350 gm

(Boylan 1996)

12 Artificial Rearing

12.1 Incubator Type

Taronga Zoo uses a Thermoline Refrigerated Incubator, model # R1250, fan forced thermostatically controlled for set temperatures indicated by digital read out to 0.1C (Boylan 1996). See Appendix 12.

12.2 Incubation Temperature and Humidity

Eggs are removed from the enclosure nesting area to containers of vermiculite or sphagnum moss, and successful incubation has been achieved at 29C-31C with relative humidity at 65-75% (Boylan, 1996).

12.3 Desired % Egg Mass Loss

N/A to reptiles (P. Harlow pers. comm.).

12.4 Hatching Temperature and Humidity

The same as incubation (Boylan, 1996).

12.5 Normal Pip to Hatch Interval

Once the hatchling has split the shell the hatching process can be between one and 24 hours (Anon, www.icffci.com, 2006)



(Photo Paul Kirk in www.icffci.com 2006)

12.6 Diet and Feeding Routine

See 7.1 Captive Diet under Section 6 Feeding Requirements.

12.7 Specific Requirements

None. Husbandry as with adults.

12.8 Data Recording

Records would include information such as: incubation, temperature/humidity; hatching temperature/humidity; pip to hatch; feeding routine; medical treatments; weight/length; along with date of each record entry.

12.9 Identification Methods

At Taronga Zoo the crested iguanas have a microchip implanted subcutaneously in the left inguinal area and are decoded using Trovan transponders (Boylan, 1996). See Appendix 13.

12.10 Hygiene

The same hygiene requirements as for adults.

12.11 Behavioural Considerations

See 10.8 under section 10 Behaviour.

12.12 Weaning

Weaning is not required with this species as hatchlings are fully independent from hatching (Boylan, 1996).

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15 Glossary

arboreal	Living in, or connected with trees
cloaca	The common chamber into which digestive, urinary and reproductive systems empty and that opens exteriorly through the vent or anus
deposition	The laying of eggs
endemic	Confined to a specific area
endoparasite	A parasite that lives on the inside of its host
femoral pores	Openings on the underside of the thighs which produce a waxy exudate
genus	A group of species having similar characteristics
gravid	The reptilian equivalent of mammalian pregnancy
heliothermic	Pertaining to a species that basks in the sun
hemipenis	The copulatory organ of a male lizard or snake
herbivorous	Feeds on plants
heterozygosity	With dominant and recessive genes determining particular characteristics
hybrid	Offspring resulting from the breeding of two species
insular	Island dwelling
juvenile	A young or immature specimen
littoral	A region lying along a shore
oviposit	To lay eggs
parietal eye	A sensory organ positioned mid-cranially
pathogen	An agent causing disease
photochemical	The chemical effects of light
polymorphic	Polymorphism is the existence of various different forms I the successive stages of the development of an organism
sexual dimorphism	Exhibiting distinct forms between male and female
snout-vent length	A standard measurement of body length. The measurement is from the tip of the nose (snout) to the anus (vent), and excludes the tail
species	A group of similar creatures that produce viable young breeding
subcutaneously	Under the skin

sub-species	The subdivision of a species. A race that may differ slightly in colour, size, scalation or other criteria
taxonomy	The classification of plants and animals.
vent	The external opening of the cloaca, anus

16 Appendix

1. ASMP Regional Census Plan 2006 for Fijian Crested Iguana
2. Fijian Crested Iguana exhibit, Taronga Zoo (Photograph Deirdre Reidpath)
3. Osram Ultra – vitalux 300w globe
4. Digital Ultra – violet Radiometer – Solarmeter Model 6.2UVB/cm
5. MSDS – Bleach
6. MSDS – Divermite
7. Captive Diet Plans from Adelaide and Taronga Zoos
8. IATA Container Requirements
9. CITES Packers Guidelines
10. New Zealand Environmental Risk Management Authority controls for importing the Fijian crested iguana
11. Genealogy Chart for Taronga Zoo's crested iguanas
12. Thermoline Incubator
13. Trovan Transponders/Microships

Australasian Species Management Program

REGIONAL CENSUS AND PLAN 16th Edition

as at 1st January 2006

Compiled by the
Australasian Regional Association of Zoological Parks and Aquaria
Mosman, NSW, Australia

Edited by
Kevin Johnson and Caroline Lees



Iguana		Brachylophus fasciatus				
Adelaide	1.	0.	0.	0.	0.	FOLLOW CMP; PHASE OUT
Auckland	0.	0.	0.	2.	2.	0 ACQUIRE AS BECOME AVAILABLE > 2006
Beerwah	0.	0.	0.	1.	0.	0 FOLLOW TAG RECOMMENDATIONS
Crocodylu	1.	0.	0.	1.	1.	0 ACQUIRE
Curumbin	0.	1.	0.	8.	20.	0 MAINTAIN
Kula ECO	8.	20.	0.	2.	2.	0 ACQUIRE FOLLOW CMP
Mogo	0.	0.	0.	1.	0.	0 MAINTAIN
Palmgrove	1.	0.	0.	0.	0.	0 DELETE BY ATTRITION
Sydney	1.	0.	0.	15.	25.	0
Totals	12.	21.	0.	15.	25.	0

IUCN Endangered; CITES I; VPC 2
ASMP Reptile and TAG; Population Management Program; Management Level 1a

Tag notes: Excluding the KULA ECO animals, there is very little meaningful breeding capacity remaining in the captive population. Efforts are underway to place lizards to maximise their potential value to either Brachylophus species

ASMP Species Coordinator: Paul Andrew, SYDNEY, pandrew@zoo.nsw.gov.au. Scope of data: Australasia.
Data current to: 30/06/2001.

AZA Studbook Keeper: Mr. John Kinkaid, SANDIEGOZ, jkinkaid@sandiegozoo.org. Data current to: 01/01/1999.

Fijian Crested Iguana		Brachylophus vitiensis				
Adelaide	1.	1.	0.	1.	3.	0 FOLLOW CCP
Auckland	0.	0.	0.	1.	1.	4 FOLLOW CMP; ACQUIRE
Beerwah	3.	1.	6.	10.	10.	10 ACQUIRE AND BREED ACCORDING TO CMP
Crocodylu	2.	2.	0.	2.	2.	0 BREED ACCORDING TO CMP
Curumbin	0.	0.	0.	3.	3.	0 ACQUIRE, FOLLOW TAG RECOMMENDATIONS
Kula ECO	12.	13.	0.	8.	10.	0 DELETE BY TRANSFER
Melbourne	5.	7.	9.	3.	6.	0 FOLLOW REGIONAL RECOMMENDATIONS
Mogo	1.	0.	0.	1.	1.	0 FOLLOW CMP
Palmgrove	1.	2.	0.	1.	2.	0 FOLLOW CMP
Perth	2.	2.	0.	2.	2.	0 MAINTAIN IN 2006
Sydney	3.	1.	0.	4.	10.	0 BREED ACCORDING TO DRAFT PMP
Yarralum	1.	1.	0.	1.	1.	0 MAINTAIN ACCORDING TO CMP
Totals	31.	30.	15.	37.	51.	14

IUCN Critically Endangered; CITES I; VPC 2
ASMP Reptile and TAG; Conservation Program; Management Level 1a

Tag notes: Recommendations for no breeding reiterated for 2005-06. Discussions ongoing with Fijian agencies to finalise a Memorandum of Agreement that would enable the transfer of lizards from KULA ECO.

ASMP Species Coordinator: Peter Harlow, SYDNEY, pharlow@zoo.nsw.gov.au. Scope of data: Australasia. Data current to: 20/09/2000.

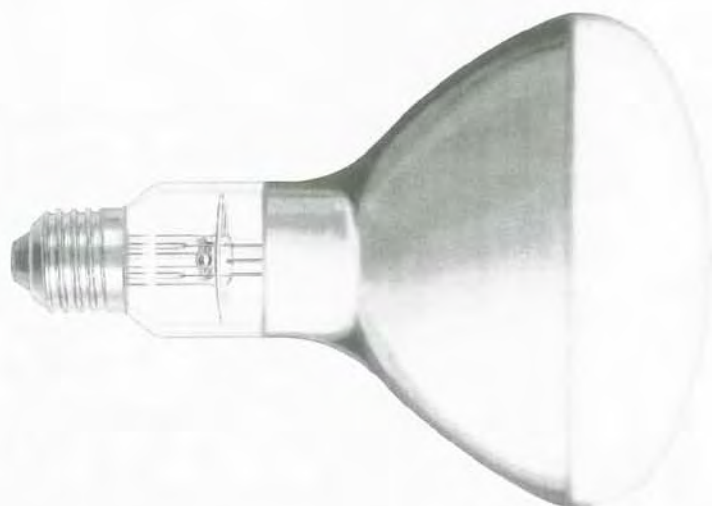
Rhinoceros Iguana		Cyclura cornuta cornuta				
Beerwah	2.	3.	0.	2.	3.	0 MAINTAIN
Crocodylu	3.	2.	3.	3.	2.	3 MAINTAIN
Mogo	1.	1.	0.	1.	1.	0 MAINTAIN
Sydney	1.	3.	0.	1.	3.	0 MAINTAIN
Yarralum	0.	0.	4.	1.	3.	0 MAINTAIN
Totals	7.	9.	7.	8.	12.	3

IUCN Vulnerable; CITES I; VPC 3a
ASMP Reptile and TAG; No Regional Program; Management Level 3

EAZA Studbook Keeper (Cyclura cornuta): Mr. Rudolf Wicker, FRANKFURT.
AZA Studbook Keeper (Cyclura): Tandora Grant, SANDIEGOZ, tandora@sandiegozoo.org. Data current to: 05/12/1996.
AZA Species Coordinator (Cyclura): Mr. Rick Hudson, FORTWORTH, iguanhudson@aol.com. Data current to: 05/12/1996.



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smoother with a healthy suntan as a cosmetic side-effect.
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How to use the sunlamp

Before exposure lightly apply some cream to smooth the skin. Do not use special sunmilk or similar since their UV-filter prevents erythema and as a consequence tanning.

Medicine which as a side-effect increases UV-sensitivity should be discontinued; in cases of doubt consult your physician.

With sufficient radiation a normally reacting skin produces a reddening 2-6 hours after the exposure which is followed a few days later by a gradual tanning. Not everybody, however, is born with a skin which reacts with tanning to sun radiation. Medical tests carried out with a large number of persons have shown that only 78% of the test persons had a normally reacting skin whilst 14% with sensitive skin (types I and II) tended to a strong erythema without tanning and 8% (with mediterranean skin type IV) became pigmented without erythema and can be considered insensitive to sun radiation. The following radiation instructions are based on these various skin types.

During exposure it will be sufficient to close the eyes and if necessary to cover them with cotton wool. Persons with particularly sensitive eyes should use sunglasses.

In order to obtain an even tanning of the face we recommend to turn and tilt the head slowly during exposure.

For the treatment of diseases the exposures should be carried out only under medical supervision.

Exposure plan

Exposure plan with distance between sunlamp and person of 50-75 cm
If the distance between sunlamp and person is approx. 50 cm (20 in.) the biological effect is approx. 6-7 times greater than that of normal sunlight. For a normally reacting skin type erythema (reddening of the skin) is achieved after approx. 3 minutes exposure time. The same effect could be reached after 35 minutes exposure to sunlight at noon on a mid-summer day.

a) Persons with normally reacting skin (skin type III)

The following exposure times are recommended for persons of normal sensitivity acquiring a reddening of the skin and a tanning later on:

Day	1	2	3, + 4	5	6	7, + 8	9, + 10	11, - 14
Exposure-time	3	4	6	7	—	9	11	14 minutes

Do not expose again until after an interval of at least 4 weeks!

6

b) Persons with sensitive skin (skin types I and II)

Persons with sensitive skin should begin with a trial exposure of 1 minute. If a noticeable reddening develops after 2-6 hours, exposure times should be limited to one-fourth of the figures shown under a). If the skin does not redden, the exposure time on the second day should be 2 minutes. In case a reddening of the skin results at this time, apply one-half of the periods under a).

c) Persons not sensitive to radiation (skin type IV)

Persons not sensitive to UV acquiring no reddening of the skin but only a suntan - even after a long sunbath - should double the exposure times shown under a). An exposure period of 20 minutes should not be exceeded, even if no reddening or suntan results which is possible with persons insensitive to UV.

Directions for use of the OSRAM ULTRA-VITALUX® sunlamp

Screw the OSRAM ULTRA-VITALUX® tanning lamp into the unit and connect to the mains supply. After switching the lamp on, wait about 2 minutes before use. After use, allow the lamp to cool down for 2 to 3 minutes before switching on again.

The distance between lamp and person during exposure should be at least 50 cm (= 20 in.).

During exposure it is sufficient to close the eyes and if necessary cover them with cotton wool.

In the case of particularly sensitive eyes sunglasses should be used.

Technical data

The **OSRAM ULTRA-VITALUX®** is a sunlamp with a special hardglass bulb and interior reflector which was tested with great success in Germany as well as abroad. The lamp should be protected from water drops and splashes.

Lamp wattage: 300W
Base: E27 (IEC 7004-2.1)
Service life: 1000 h
Burning position: universal
Run-up time: 2 min
Restart of hot lamp: 2 min

(F)

Pourquoi avons nous un tel besoin de soleil?

La vie quotidienne ne nous laisse que peu de temps pour apprécier pleinement ce que notre soleil nous offre: un rayonnement salubre indispensable à la vie. En raison d'une industrialisation de plus en plus poussée, l'ère humaine effective son travail de plus en plus dans des pièces qui, dans le meilleur des cas, ne laissent plus passer qu'une lumière solaire filtrée. Non seulement les adultes sont concernés, mais encore plus les enfants qui grandissent dans les villes et les zones industrielles sous une cloche de fumée enlevant à la lumière solaire son rayonnement le plus vital.

Le manque de rayonnement solaire provoque, au bout d'un certain temps, cer-

7

MSRP
\$179

UVB
METER

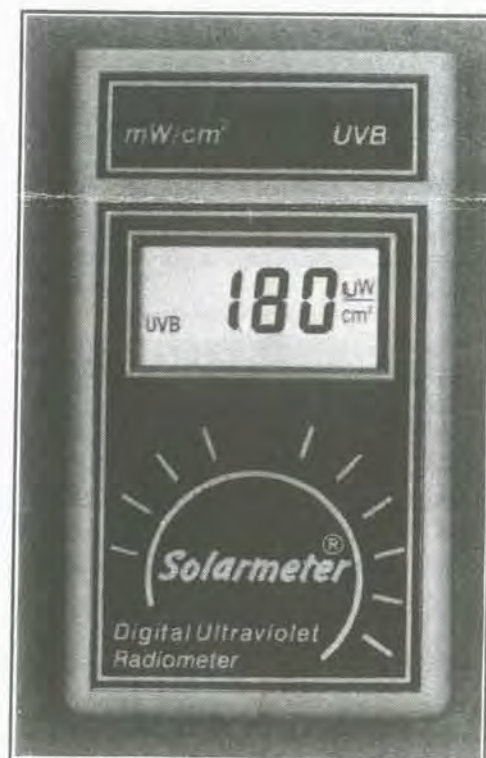
Solarmeter®

- *Digital UV-Meter/Model 6.2*
- *Efficient, Hand-Held Unit with Integral Sensor*
- *Calibration Accuracy Traceable to NIST (NBS) Standards*

Features

ATTRACTIVE
COMPACT
DURABLE
LCD READOUT
ACCURATE

Applications



distributors for
Allsun Solariums
UVAScan
Vertical Tanners
Sales
Leasing
Service
Parts
Complete Range of
Tanning Lotions &
Accessories
Office & Showroom
Unit 2, 9 Cleaver Street
West Perth WA 6005
Ph 08 9228 2699
Fax 08 9228 2399
Email
ass@jazzline.net.au

Australian Sunroom Suppliers
Astid Kemmen, Tom Long

www.solarmeter.com

Material Safety Data Sheet - Bleach

Classified as hazardous according to the criteria of Worksafe Australia

Section 01 Identification

[Home](#)

MSDS: Rev 2 Date: 06 August 2003
Domestic Trade Name: Bleach
Other Names: Hypochlorite Solution, Bleach Solution, Hypo.
Manufacturers Product Code: None Allocated
UN Number: 1791
Dangerous Goods Class: 8
HAZCHEM Code: 2X
Poison Schedule Number: None Allocated
Use: Bleaching Agent, Disinfectant

Section 2 Physical Description / Properties

Appearance: Clear, green-yellow liquid having a chlorine odour. Bleach is strongly corrosive and a moderate oxidising agent.
Boiling Point or Melting Point: 110°C (15% available Chlorine)
Vapour Pressure: Not Available
Specific Gravity: 1.1
Flash Point: Not Available
Flammability Limits: Not Available
Solubility in Water: Aqueous Solution

Section 3 Other Properties

pH of Concentrate: 12 (approximately)

Section 4 Ingredients

Chemical Name:	CAS Number:	Proportion:
Sodium Hypochlorite [NaOCl]	7681-52-9	10% weight / volume
Sodium Hydroxide [NaOH]	1310-73-2	0.8%
Water	-	Remainder

Section 5 Health Effects

Acute: Corrosive and irritating if swallowed or ingested. Dangerous when in contact with the eyes.
Swallowed: Severe internal irritation due to corrosive effect.
Eye: Severe irritation and burns.
Skin: Irritation and burns.
Inhaled: Irritation of respiratory tract, resulting in coughing and breathing

Chronic: difficulty caused by chlorine fumes.
If condition persists, seek further attention.

Section 6 First Aid

Swallowed: Wash out mouth with water and give water to drink. Do not induce vomiting.

Eye: Irrigate immediately with water for 15 minutes and seek medical attention.

Skin: Wash with large amounts of water. Remove affected clothing and wash underlying skin.

Inhaled: Remove from exposure. Keep warm and at rest.

Section 6B First Aid Facilities:

Advice to Doctor: Treat symptomatically.

Section 7 Precautions for Use

Exposure Standard: There are no exposure limits available.

Engineering Controls: Use in open or well ventilated areas.

Personal Protection: Wear PVC gloves and chemical goggles. An acid resistant respirator to AS 1716 is recommended if spray mists are produced during use. It is recommended that a shirt with long sleeves and long trousers be worn. Always wash skin and clothing after using this product.

Flammability: Non-flammable.

Section 8 Safe Handling Information

Storage and Transport: This product is classified as non dangerous according to the ACTDG. Store in plastic containers in a clean, dry, cool, well ventilated place away from foodstuffs, other oxidising agents and acids. Store and transport in an upright container. Containers must be carefully vented to release any pressure build-up.

Spills and Disposal: Minimise leak and or contain spills. Collect as much of the spillage as possible. Keep pH of the remaining spilled solution above 7.0 and dilute it with large amounts of water. Avoid contact with acids. Add soda ash to the cleanup liquid to minimise release of chlorine gas during cleanup.

Fire / Explosion Hazard This product is not flammable under the conditions of use and does not support combustion.
The product is stable and will not polymerise. It is incompatible with strong acids, metals, metal salts, peroxides and other oxidising agents and with reducing agents. It decomposes on exposure to heat or light. Upon heating or upon contact with acids, this product may emit toxic fumes, including chlorine gas which has a TLV of 1 ppm; 3 mg/m³ – peak exposure. Source: NOHSC (under review). If the product is involved in a fire, fire fighters should wear self-contained breathing apparatus as well as PVC

gloves and chemical goggles. Fire fighters should fight any fires with dry chemical, carbon dioxide, vaporising liquid or foam extinguishers or water delivered in a fine spray or fog if available.

Section 9 Other Information

Sodium hydroxide solution is chemically sensitive to:

Acids, Temperature, Metals and Aging

Section 10 Contact Point

Customer Service: 1300 307 755

Emergency Advice: 1300 307 755

Important Notes

This MSDS 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.

The user should contact the Solo Pak Customer Service Department if clarification or further information is needed to make an appropriate risk assessment of the use of this material.

Home



MATERIAL SAFETY DATA SHEET

Page 1 of 3
Date Issued: 4 June 2004

STATEMENT OF HAZARDOUS NATURE

Classified as Hazardous according to criteria of NOHSC Australia – Xn harmful, Xi irritant: R22 harmful if swallowed, R38 irritating to skin, R41 risk of serious damage to eyes.

JohnsonDiversey Pty Ltd
ACN 000 065 725
29 Chifley St, Smithfield NSW 2164
Telephone: (61) 2 9757 0300 Fax: (61) 2 9725 5767
Emergency Telephone: ERS: 1800 033 111 (24h)
National Poisons Information Centre: (61) 13 11 26

JohnsonDiversey NZ Ltd
3 Diversey Lane, Papatoetoe, Auckland, NZ
Telephone: (64) 9 2782119 Fax: (64) 92784286

National Poisons: (64) 3 474 7000

IDENTIFICATION

PRODUCT NAME:

DIVERMITE D1 PLUS

PRODUCT CODE:

HH11061 Divermite D1 Plus 1.5kg

UN NUMBER:

None Allocated

DANGEROUS GOODS CLASS:

None Allocated

HAZCHEM CODE:

None Allocated

POISON SCHEDULE NUMBER:

None Allocated

PACKAGING GROUP

None Allocated

SAFETY PHRASES

S2: Keep out of the reach of children. S24/25: Avoid contact with skin and eyes. S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28: After contact with skin, wash immediately with plenty of water. S39: Wear eye / face protection.

PRODUCT USE:

Hand dishwashing general purpose cleaner concentrate.

PHYSICAL DESCRIPTION/PROPERTIES

APPEARANCE/ODOUR

Clear, yellow viscous liquid with a lemon fragrance.

BOILING POINT

Approx. 100°C.

MELTING POINT

Not determined.

VAPOUR PRESSURE

Not determined.

SPECIFIC GRAVITY

Approx. 1.020 at 20°C.

FLASH POINT

Not flammable.

FLAMMABLE LIMITS

Not applicable.

WATER SOLUBILITY

Complete.

OTHER PROPERTIES

STABILITY / REACTIVITY

Product is stable and unlikely to react in a hazardous manner under normal conditions of use..

EVAPORATION RATE

Not determined.

pH

Approx. 7 (10% solution at 20°C)

HAZARDOUS VOLATILE ORGANIC COMPOUNDS

No hazardous volatile organic compounds known.

OTHER INFORMATION

The typical in-use concentration of 1-3g D1 Plus Concentrate/10L Water is not classified as hazardous according to criteria of NOHSC Australia.

MATERIAL SAFETY DATA SHEET**DIVERMITE D1 PLUS**

Date Issued: 4 June 2004

Page 2 of 3

Supersedes: 20 June 2003

INGREDIENTS

Isopropylamine alkylbenzene sulfonate (CAS# 68584-24-7)	60.6	Not established
Alcohols, C12 – 15, ethoxylated (CAS# 68131-39-5)	28.4	Not established
Other ingredients determined not to be hazardous	to 100 %	Not established

HEALTH HAZARD INFORMATION**ACUTE HEALTH EFFECTS****- SWALLOWED**

This product is irritating to the gastro-intestinal tract. Ingestion may result in nausea, abdominal irritation, pain and vomiting.

- EYE

An eye irritant. Contamination of the eyes with anionic surfactants produces corneal damage, in some cases severe. Healing may take several days. Temporary clouding of the cornea may occur.

- SKIN

Irritating to skin. Can have a degreasing action on the skin and may cause irritant contact dermatitis on prolonged and repeated contact.

- INHALED

Product is non-volatile. However, the vapour or mist if inhaled causes irritation to the respiratory system.

MEDICAL CONDITIONS**AGGRAVATED BY EXPOSURE**

In-use concentration may cause respiratory and dermal irritation to some individuals with a known sensitivity to Divermite D1 Plus or surfactants.

CHRONIC HEALTH EFFECTS

No effects reported following long-term exposure.

FIRST AID:**- SWALLOWED**

Immediately rinse mouth with water. Do not induce vomiting. Give 1-2 glasses of water. For advice, Contact a Poisons Information Centre or a doctor at once.

- EYE

Hold eyelids open and flush immediately with plenty of water for 15 minutes. Seek medical advice immediately.

- SKIN

Wash contaminated area with plenty of water. Remove immediately contaminated clothing. If irritation occurs, get medical attention.

- INHALED

Remove to fresh air. If effects persist, get medical attention.

FIRST AID FACILITIES

Eye wash station.

ADVICE TO DOCTOR

Treat symptomatically.

PRECAUTIONS FOR USE**EXPOSURE LIMITS**

For specific exposure limits see the Ingredient Information.

ENGINEERING CONTROLS

General room ventilation is normally adequate. Substantial amounts of mists/vapours can be controlled with local exhaust ventilation or respiratory protection.

PERSONAL PROTECTION:**- RESPIRATORY PROTECTION**

Avoid inhaling mist or vapour. Where ventilation is inadequate and vapours or mists are generated, the use of an Air Purifying Respirator complying with AS/NZS 1715 and AS/NZS 1716 is recommended.

- PROTECTIVE GLOVES

Impervious Plastic or Rubber Gloves are recommended.

- EYE PROTECTION

Recommend Chemical workers splash-proof goggles, or wear eye/face protection.

OTHER PROTECTIVE MEASURES

Use good hygiene practices.

FLAMMABILITY

Not flammable.

SAFE HANDLING INFORMATION**TRANSPORT OF DANGEROUS GOODS**

Not classified as dangerous goods by the Australian Code for the Transport of Dangerous Goods by Road and Rail.

MATERIAL SAFETY DATA SHEET**DIVERMITE D1 PLUS**

Date Issued: 4 June 2004

Page 3 of 3

Supersedes: 20 June 2003

SAFE HANDLING INFORMATION (CONT)

STORAGE	Keep containers closed at all times when not in use. Check regularly for leaks. Keep out of reach of children.
SPILL CONTROL	For small spills, wash to drain with plenty of water. For large spills, contain spill with sand, earth or similar inert absorbent material. Sweep up contaminated absorbent material and place in a suitable labelled and covered container for disposal at an approved site. Rinse affected area thoroughly with water. Full protective clothing must be worn by clean up crew. Can be slippery surface when wet. Care should be taken not to slip on contaminated/wet area.
PERSONAL PRECAUTIONS	Use good personal hygiene practices. Avoid contact with skin and eyes.
DISPOSAL OF CONTAINERS	Rinse empty container thoroughly with water and place in trash collection.
DISPOSAL METHOD	In accordance with government regulations for the disposal of special waste.
ENVIRONMENTAL PROTECTION	For large spills of bulk product, prevent spills from entering into drain, sewer system or water course.
EXPLOSION HAZARD	No explosion sensitivity.
HAZARDOUS DECOMPOSITION PRODUCTS	No hazardous decomposition products known.
FIREFIGHTING PROCEDURES	Normal firefighting procedures may be used. Breathing apparatus and full protective clothing should be worn when tackling fires to minimise risk of exposure to hazardous combustion gases and other thermal decomposition products. Use extinguishing media appropriate to surrounding fire conditions.
EXTINGUISHING MEDIA	Compatible with Foam, CO ₂ , Dry Chemical or Water Fog.
REACTIVITY	Not applicable.
HAZCHEM CODE	None allocated.

OTHER INFORMATION

LD50 (Acute Oral toxicity)	Not determined.
LD50 (Acute Dermal toxicity)	Not determined.
LC50 (Acute Inhalation toxicity)	Not determined.
CARCINOGENICITY	None known.
TERATOGENICITY	None known.
MUTAGENICITY	None known.
FISH TOXICITY	Not determined.
BIODEGRADABILITY	Not determined
CHEMICAL INGREDIENTS	All ingredients used in this product are registered on the Australian Inventory of Chemical Substances.

CONTACT POINT

TECHNICAL DEPARTMENT	For further information on any details described in this MSDS, please contact JohnsonDiversey Pty Limited Head Office: (02) 9757 0300 (b/h) Toll Free: 1800 251 738 (b/h)
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PRINT DATE: 4 June 2004

Appendix 3

Adelaide Zoo

Fijian Crested Iguana Food Mix

Iguanas receive this diet 3 times per week, Mon, Wed, Fri. On other days browse consisting of hibiscus flowers or milk thistles is offered. Scatter browse around exhibit for behavioural enrichment feed.

This diet plan is for two animals.

Fruit and vegetable mix

Apple (red or green) 15gm (total)
Pear 15gm
Rockmelon or honeydew 10gm (total)
Potato (cooked) 14gm
Boiled egg (not too much as causes diarrhea) 10gm
Carrot 20gm
Broccoli 40gm
Cauliflower 15gm
Zucchini 20gm

Greens

Cos lettuce 10gm
Endive 10gm
Coral lettuce (red and green) 15gm (total)
Celery (heads only) 4gm

Food Preparation

Cut or tear the greens into pieces, large enough for the animals to break pieces off, as they would in the wild. Cut the fruit/veg into cubes roughly 5 - 10mm.

Supplements

Sprinkle supplements over the fruit and veg.

1. Rep-Cal Phosphorous-Free CALCIUM with VIT. D3
2. Rep-Cal HERPTIVITE, with Beta carotene 'Multivitamin powder'

Mix the two together to form a ratio of 1:1.

Manufactured by: Rep-Cal Research Labs

<http://www.repcal.com>

(M Guy pers comm)

Taronga Zoo

Serpentaria Iguana and Tortoise Basic Mix

For one Iguana use approx 40gm of this mix. This is our basic herbivorous tortoise diet, which we prepare three days each week.

Fresh vegetables

Alfalfa sprouts - 1 punnet
 Apples - 200g
 Carrot - 200g
 Escarole* - 1 bunch (about 500g)
 Kale* - 1 bunch (about 500g)
 Mung bean sprouts - 1 punnet
 Parsley* - 1 bunch (about 500g)
 Pears - 400g
 Pumpkin - 400g
 Rockmelon - 400g
 Tomatoes - 200g
 Endive* - 1 bunch (about 500g)
 Paw paw - 400g
 Sweet potato - 200g
 Squash - 400g

When the green leafy vegetables above are out of season or expensive (those marked with a *), we try to substitute with other greens such as bok choy, broccoli leaves, watercress etc.)

Frozen Vegetables

Peas (frozen) 200g
 Beans (frozen) 200g
 Corn kernals (frozen) 200g

Preparation

1. Cut the apples, pears, rockmelon, tomatoes, paw paw and squash into bite size chunks. Leave skins on, but remove the seeds from the apples, pears, rockmelon and paw paw.
2. Dice the greens into small, bite size pieces (Escarole, kale, endive, parsley)
3. Grate the hard vegetables (sweet potato, carrots, pumpkin)
4. Add frozen vegetables (peas,beans,corn), alfalfa and mung bean sprouts.

Supplements

One day per week add approx 2 teaspoons of Rep-Cal Calcium with Vit.D3, mix everything together.

(P. Harlow, Taronga Zoo)



Container Requirements

CONTAINER REQUIREMENT 41

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

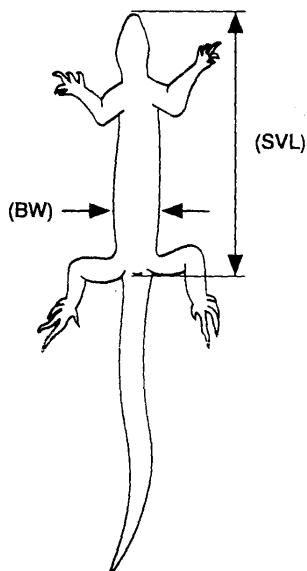
Applicable to Lizards and Tuataras

△ See *USG Variations in Chapter 2 and Variations CO-01/04/05/09, and UA-05 in Chapter 3.*

The following instructions must be complied with in addition to the principles laid down in the General Container Requirements for Reptiles and Amphibians.

Measurement

Lizards (including Chameleons) and tuataras should be measured by snout-to-vent length (SVL) and in body width (BW).



Specific Requirements

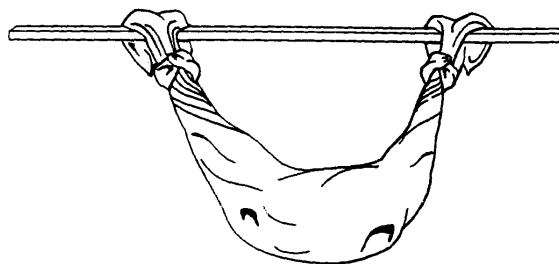
All containers and bags should have some kind of packing material (i.e. crumpled paper). Animals in the same containers or bags should belong to the same size class to avoid damage to smaller individuals.

The maximum number of animals per bag or container must not be increased even when larger bags or containers are used.

Packing Density for Lizards and Tuataras (not including Chameleons and farmed Iguana iguana):

Snouth-vent-length (SVL)	Body-width (BW)	Maximum no. of animals per bag	Minimum bag size
≥ 20 cm (8 in)	≥ 5 cm (2 in)	1	Depending on the size of the animal
≥ 15 < 20 cm (6 < 8 in)	≥ 2.5 < 5 cm (1 < 2 in)	15 10	45 × 60 cm (18 × 24 in) 30 × 45 cm (12 × 18 in)
≥ 10 < 15 cm (4 < 6 in)	< 2.5 cm (1 in)	30 20	45 × 60 cm (18 × 24 in) 30 × 45 cm (12 × 18 in)
< 10 cm (4 in)	< 2.5 cm (1 in)	30	30 × 45 cm (12 × 18 in)

If the bag is suspended the bag must be suspended horizontally from opposite ends of the bag the maximum number of animals per bag should be divided by two.



For lizards, rigid containers can be used instead of bags with a maximum of 25 animals, under the same conditions for the snake containers.

Arboreal geckos will be provided the use of the surface area of the floor and wall space of rigid containers.

Large Animals

Lizards whose length range from 90–120 cm (36–48 in) SVL require double bags for shipping.

Lizards of 120 cm (48 in) or more in length must follow the same primary enclosure requirements as crocodiles excluding the taping or banding of the mouth.

The direction of the head should be indicated on the outer enclosure.



Live Animals Regulations

CONTAINER REQUIREMENT 41 (cont'd)

Lizard species that should be packed singly because they are either aggressive, cannibalistic or delicate:

Malagasy leaf geckoes (*Uroplates* spp.)
 New Caledonian giant geckoes (*Rhacodactylus* spp.)
 Asian gliding agamid (*Draco* spp.)
 Sail-finned lizard (*Hydrosaurus* spp.)
 Angle-headed dragon (*Gonocephalus* spp.)
 Helmeted basiliscs (*Corytophanes* spp.; *basiliscus* spp.)
 — (except hatchlings and juveniles)
 Caiman lizard (*Dracaena* spp.)
 Emerald tree monitor lizard (*Varanus prasinus*)
 Black tree monitor lizard (*Varanus beccari*)
 Solomon Island pre-hensile tailed skink (*Corucia zebrata*)

Venomous lizards that must be handled and packed like venomous snakes (see Container Requirement 44), these are:

Gila monster, beaded lizard (*Heloderma* spp.)

Specific Requirements for Chameleons including African Dwarf Chameleons (*Rhampholeon*) and Malagasy Dwarf Chameleons (*Brookesia*)

All species with the exception of young and small specimens (see below) must be packed individually.

Chameleons 10 cm (4 in) or greater in SVL need to be packed in adequate space to rest naturally. The enclosure needs to conform to the body shape and size. Specimens should be packed one per inner enclosure. The inner enclosure may be cloth, woven material, or rigid container. Crushed or crumpled paper must fill at least 25% of inner enclosure.

Chameleons of 2.5–10 cm (1–4 in) in SVL must be packed one per inner enclosure. Inner enclosures may be fibrous woven tubes with each open end of tube securely enclosed in a manner that can be resealed, cloth, rigid container, or heavy gauge paper enclosures. Heavy gauge paper should be defined as a container that is sufficient to hold specimens without escape.

Inner enclosures must be easily opened and closed. If heavy gauge paper enclosures are used as inner enclosures, they must be secured to a frame of support bars in the primary or outer enclosure with tacks or nails with head diameter of at least 0.6 cm (1/4 in). No burlap (hessian) bags as inner enclosures are permitted.

Chameleons less than 2.5 cm (1 in) SVL can be packed with a maximum of 10 per 0.5 liter rigid enclosure. At all times, the specimens must be able to have full contact with the container floor. At least 50% of the inner enclosure must be filled with loosely crumpled paper.

Crushed or crumpled paper must be provided to ensure a foothold for the animal.

Packing Density for Farmed Green Iguanas (*Iguana iguana*)

Since farmed Green Iguanas (*Iguana iguana*) are usually in good condition, free of diseases and used to handling, the use of following special packing density is allowed.

Snout-vent-length (SVL)	Maximum no. of animals per bag/box	Minimum bag size	Minimum box size
> 25 cm (10 in)	1	Depending on the size of the animal	—
> 20 cm (8 in)	6	45 × 85 cm (18 × 34 in)	—
> 17.5 cm (7 in)	6	30 × 60 cm (12 × 24 in)	20 × 40 × 9 cm (8 × 16 × 3 3/8 in)
> 12.5 cm (5 in)	20	30 × 45 cm (12 × 18 in)	20 × 40 × 6.5 cm (8 × 16 × 2 3/8 in)
> 10 cm (4 in)	30	30 × 45 cm (12 × 18 in)	20 × 40 × 4.5 cm (8 × 16 × 1 3/4 in)
> 8.75 (3.5 in)	40	30 × 45 cm (12 × 18 in)	20 × 40 × 4.5 cm (8 × 16 × 1 3/4 in)
0–8.75 cm (3.5 in)	50	30 × 45 cm (12 × 18 in)	20 × 40 × 4.5 cm (8 × 16 × 1 3/4 in)

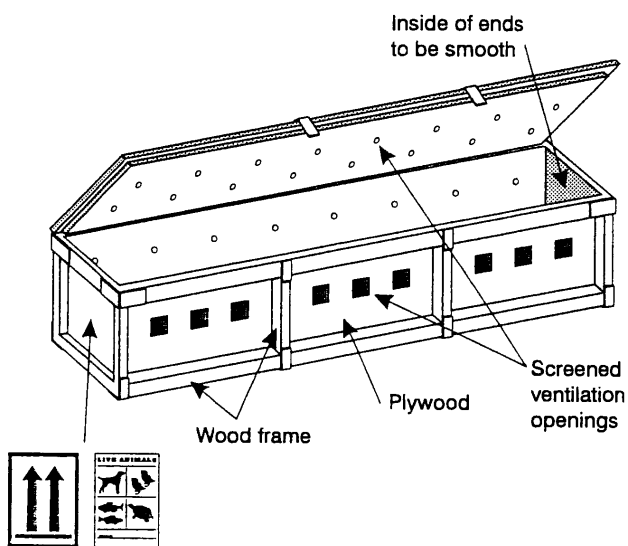


Container Requirements

CONTAINER REQUIREMENT 41 (cont'd)

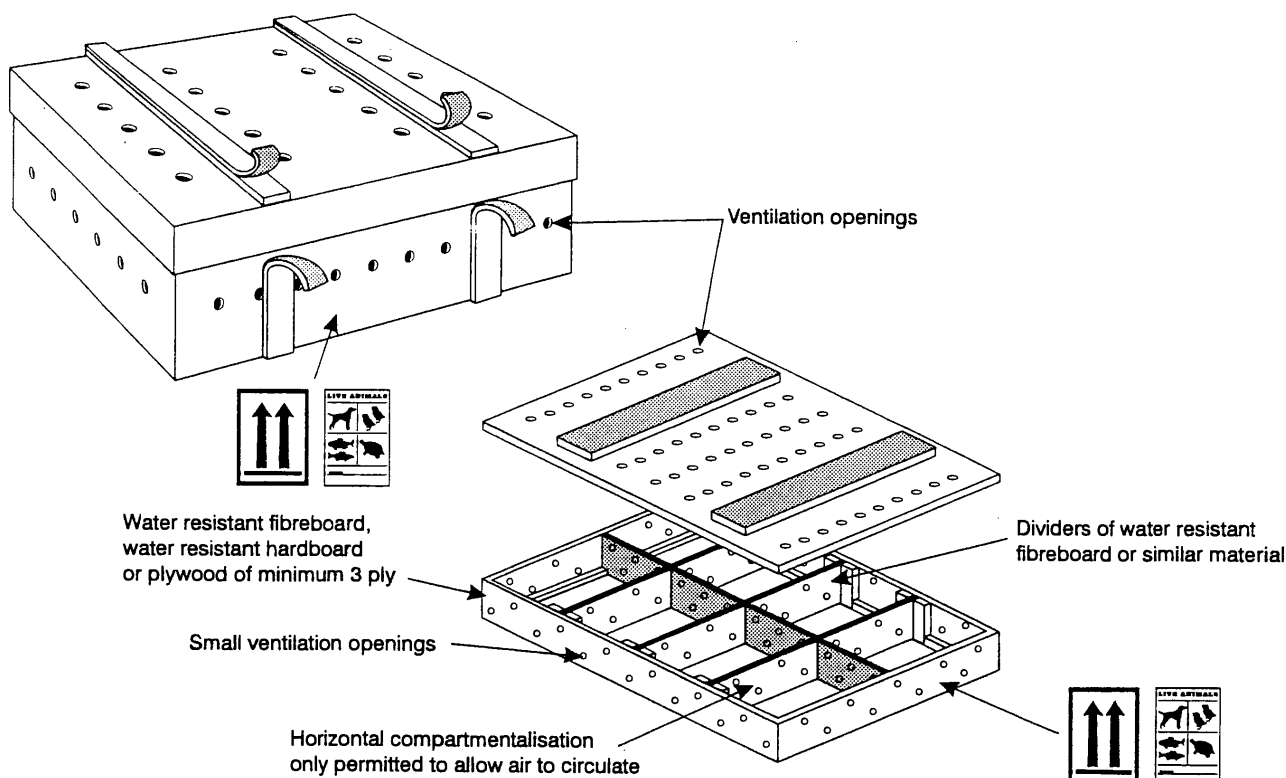
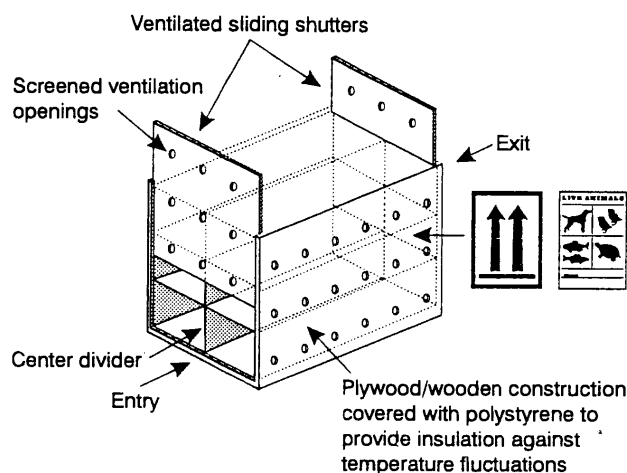
EXAMPLE:

SINGLE CONTAINER



MULTIPLE CONTAINER

(suitable for small or young animals not exceeding 50 cm [20 in] in total length)

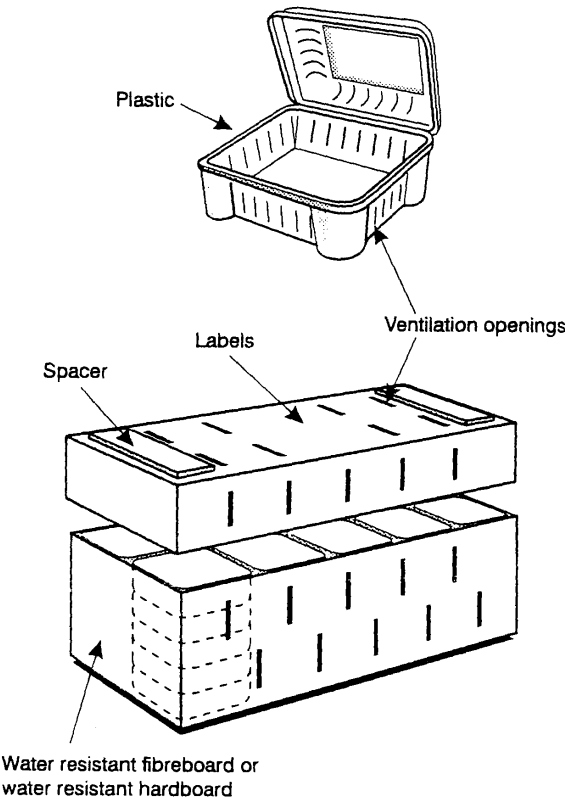


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41

CONTAINER REQUIREMENT 41 *(cont'd)*

MULTICOMPARTMENT CONTAINER





PACKER'S GUIDELINES

Rp/3 – Tortoises and land turtles, snakes, lizards

1. General welfare

- 1.1 Reptiles should have priority over merchandise.
- 1.2¹ Only reptiles in good health should be transported.
- 1.3 Reptiles should not be sedated.
- 1.4¹ Reptiles of different species should not be transported in the same compartment or bag.
- 1.5 Unless reptiles of the same species are known to be compatible with one another, they should not be transported in the same compartment or bag.
- 1.6 Reptiles should be left undisturbed during transport.
- 1.7² Reptiles that have become sick or that have been injured during transport should receive veterinary treatment as soon as possible and, if necessary, should be humanely destroyed. A record of any such occurrences should be kept.
- 1.8² Sick or dead reptiles should be removed from containers, when feasible, and a record kept.
- 1.9 No feeding should be necessary during transport.
- 1.10 To avoid cross-infection, and for health and hygiene reasons, human contact with reptiles should be avoided, and they should not be housed near foodstuffs or in places to which unauthorized persons have access.
- 1.11 No animal should be transported with radioactive material or other substances dangerous to health.
- 1.12 Containers should be secured to the aircraft, rail wagon, lorry or ship to avoid any possible movement, and should at all times be maintained in a horizontal position.

2. Advance arrangements for transport

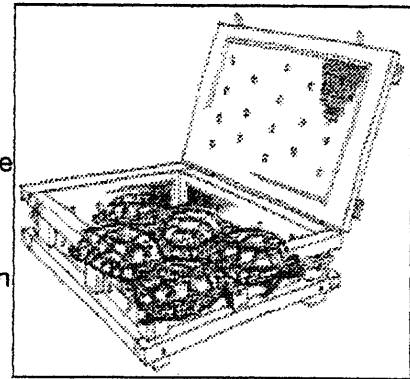
- 2.1 All possible precautions should be taken in advance to ensure that reptiles are not subjected to extremes of temperature or to draughts. This would necessitate planning their movement with due regard to the climatic conditions natural to them, and to the conditions prevailing at their final destination, and also those that will be encountered during transport. Particular attention should be paid to the facilities at any intermediate stops at airports, etc.
- 2.2 Any bags or other packing material should be destroyed after use; when containers are to be re-used they should be thoroughly cleaned and disinfected before and after use.
- 2.3 The estimated time of arrival should be notified in advance to the consignee, and also the route of the consignment. Adequate arrangements for its prompt collection at the final destination, and for any necessary movement at transit points, should be made in advance.
- 2.4 Should any delay in collection be anticipated, then advance arrangements should be made for the housing of the reptiles.
- 2.5 Cash on delivery facilities should not be used.

3. Container

- 3.1 The container should be constructed of wood, hardboard,

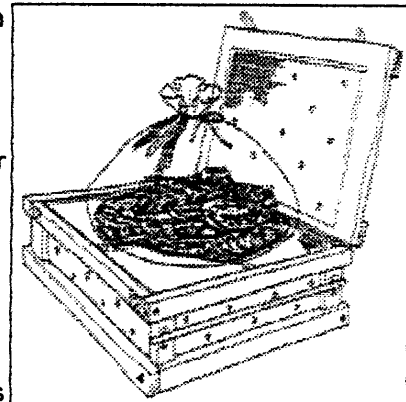
expanded polystyrene, or other material of similar strength, and there should be an adequate framework to ensure that it is strong enough to house the reptiles and to withstand the handling involved during transport.

- 3.2 There should be no sharp edges or projections on the inside surfaces of the container.
- 3.3 If any wood preservative or paint is used on the container, care should be taken to ensure that this is not toxic or a skin irritant.
- 3.4 The container may comprise a number of compartments, provided that the overall size of the container is such that it may be handled without difficulty.
- 3.5 The container should be sufficiently shallow to prevent reptiles, such as tortoises, from climbing on top of one another, and should be of a size which prevents undue movement of the reptiles, and hence minimizes the risk of injury due to violent movement of the container.
- 3.6 There should be a lid completely covering the container, fitted with a secure fastening device.
- 3.7 To ensure an adequate flow of air at all times, ventilation holes should be provided in all walls and the lid of the container. These ventilation holes should be covered with fine gauze.
- 3.8 Suitable gripper bars or lifting handles should be provided.
- 3.9 Spacer bars of adequate size should be fitted to all walls, lid and base of the container, to ensure that there is a free flow of air to the reptiles in the event of stacking or close stowing of cargo.



4. Packing

- 4.1 Snakes and lizards should be placed in suitable bags which are then sealed and labelled "POISONOUS" or "NON-POISONOUS REPTILES" as appropriate. However, bags are not suitable for general transportation of chameleons (*Chamaeleonidae*) and lizards of a spiny nature, such as some agamas (*Agamidae*). The first mentioned travel better in containers furnished with a network of rigid perches and the others in containers furnished with soft, loose material into which they can burrow.
- 4.2 In the case of small specimens, several may be packed in the same bag.
- 4.3 If necessary, dampened sphagnum moss or foam chippings may be packed around the reptiles – certain species may require salt water.
- 4.4 The bags should be firmly attached to the container.



5. Labelling and documentation

Durable, waterproof labels should be provided as follows:

- 5.1 "LIVE REPTILES – DO NOT TIP", "POISONOUS" or "NON-POISONOUS", as appropriate, on all sides and top.
- 5.2 "THIS WAY UP", with arrows indicating the top, on all sides.
- 5.3 Consignor's and consignee's name, address and telephone number. Box numbers should not be used as the sole address.
- 5.4 Detailed list of contents: number of reptiles; scientific name and common names used in the

exporting and importing countries.

- 5.5 Temperature range required.
- 5.6 Date on which reptiles were packed for transport.
- 5.7 Official stamp of carrier showing date of his receipt of consignment.

Durable, waterproof means of containing the following documents and other essential information should be firmly attached to the container:

- 5.8 Duplicate of consignor's and consignee's name, address and telephone number.
- 5.9 Duplicate list of contents as in 5.4.
- 5.10 Copies of relevant export and import licences.
- 5.11 Copy of valid health certificate issued in accordance with the requirements of the importing country.
- 5.12 Duplicate information regarding temperature range required.

-
- 1 *Exceptional circumstances may arise which justify departure from this recommendation.*
 - 2 *Reptiles are frequently in a state of torpor and, therefore, the advice of someone qualified in handling reptiles should be obtained before any action is taken in cases where there is any doubt as to the condition of the reptiles.*
-

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ENVIRONMENTAL RISK MANAGEMENT AUTHORITY

THE BULLETIN

The Bulletin is published approximately nine times per year. It is an official record of applications being processed, the Authority's decisions, and other activities under the Hazardous Substances and New Organisms (HSNO) Act 1996. If you are not already on our 'key stakeholder' list and would like to receive a copy please contact ERMA New Zealand. The Bulletin – and further information on the application process – are available on the ERMA New Zealand website: www.ermanz.govt.nz. The Bulletin can also be sent by electronic subscription: order through info@ermanz.govt.nz.

SCHEDULED HEARINGS

There are no hearings currently scheduled

NON NOTIFIED APPLICATIONS RECEIVED

Application Code: S2601002

Applicant: Yates New Zealand Limited

Purpose: Application for determination that *Steinernema feltiae* entomopathogenic nematode for the biocontrol of Fungus Gnats (Sciarid fly) are not new organisms under section 26 of the HSNO Act

Date Application Received: 2 July 2001

Application Code: NOC01003

Applicant: Genesis Research and Development Corporation Ltd

Purpose: To use *Sicyos angulatus* in containment as a model system for studying plant growth and development under varying environmental conditions

Date Application Received: 6 July 2001

STALLED APPLICATIONS

Application Code: GMD01165

Applicant: New Zealand Forest Research Institute Limited

Purpose: To develop in containment *Pinus radiata* and *Picea abies* with genes related to pest and disease, herbicide resistance, reproductive development, and to wood quality traits

Date Application Received: 16 July 2001

Date Application Stalled: 18 July 2001

Reason Stalled: Under section 52 of the HSNO Act as the Authority considers that the applicant is able to provide further information on details of previous approvals that may have been issued

by an Interim Assessment Group (IAG) or Advisory Committee on Novel Genetic Techniques (ACNGT)

DECISIONS ON APPLICATIONS

The Environmental Risk Management Authority reached a decision on the following application on 23 July 2001

Application Code: NOC01001

Applicant: Auckland Zoo

Purpose: To import the Fijian Crested Iguana (*Brachylophus vitiensis*) into specialist facilities at Auckland Zoo for conservation and exhibition purposes

Description of Organisms: Fijian Crested Iguana, *Brachylophus vitiensis*

Decision: Approved with Controls

ERMA Approval Codes: NOC002116

Controls:

The containment controls proposed by ERMA New Zealand below are grouped according to the Third Schedule of the HSNO Act (Part II), *Matters to be addressed by containment controls for new organisms excluding genetically modified organisms*. The controls are designed to reduce the probability of any escape of *B. vitiensis* from containment.

The Committee is aware that there are no established containment standards developed and endorsed by both Ministry of Agriculture and Forestry (MAF) and ERMA New Zealand for zoo animals, and that the Zoological Garden Regulations 1997 are to expire at the end of the HSNO transitional period. In preparing the following controls, the Committee sought to follow the nature of the provisions of other relevant MAF/ERMA New Zealand Containment Standards.

Please feel free to photocopy this material. Acknowledgement of ERMA New Zealand would be appreciated.

ERMA NEW ZEALAND

PO Box 131 Wellington

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Email: info@ermanz.govt.nz

Website: www.ermanz.govt.nz

ENVIRONMENTAL RISK MANAGEMENT AUTHORITY
NGĀ KAITIWHAKATŪPATO WHAKARARU TAIAO



To limit the likelihood of any accidental release of any organism or any viable genetic material:

1. *B. vitiensis* shall be contained in an enclosure which will ensure that they are securely contained. Enclosure doors must in all cases open to an enclosed service area, the doors and any other openings thereof must provide a secure secondary barrier in the event that a *B. vitiensis* might escape the primary enclosure. There shall be no enclosure doors or other potential means of egress from the enclosure that is open to a public viewing area.
2. The facility shall provide for
 - a) The receipt of animals, equipment, bedding and feed
 - b) The maintenance and care of animals
 - c) Cage washing
 - d) The disposal of dead animals and bedding wastes.
3. Dead animals shall be disposed of by incineration or deep burial.
4. The operator of the facility shall prepare, maintain and adhere to a containment manual for the maintenance and operation of the facility to ensure the effective containment of *B. vitiensis* and the adherence to these controls. The containment manual shall include:
 - a) Structural and operation standards to ensure *B. vitiensis* is secure in the containment area
 - b) Identification of management and operational staff and their respective roles
 - c) Authorisation of access
 - d) Strategies to manage the accidental release or escape of the organism.
5. Water discharge, removal of liquid or solid waste shall ensure that no viable genetic material leaves the containment area.
6. The minimum requirement for packaging for the transportation of the organisms by all modes (ie air, land and sea) from overseas and for transfers between facilities will be in accordance to Packaging Instruction No. 650 of the International Air Transport Association (IATA) Dangerous Goods Regulations (refer to MAF/ERMA New Zealand Standard 154.03.03). All containers must be clearly labelled with the name, address and phone number of both the sender and the recipient.

To exclude unauthorised people from the facility:

7. Containment area for *B. vitiensis* shall have secure and clearly marked entrances and only authorised persons, as identified in the containment manual shall have access to the inside of the containment area.
8. Visitors who require access to the containment area must have approval of the facility manager and be accompanied by authorised personnel.

To control the effects of any accidental release or escape of an organism:

9. Prior to any specimens being imported the applicant shall prepare a containment manual and include in the manual a contingency plan outlining measures it would take to recover escapes of *B. vitiensis*.
10. If for any reason a breach of containment occurs, the facility Supervisor, MAF Biosecurity Authority and ERMA New Zealand shall be notified immediately the event is notified to the facility manager (and at least within 24 hours of the breach being detected).
11. In the event of any breach of containment of the organisms, the contingency plan for the retrieval or destruction of any *B. vitiensis* that escaped shall be implemented immediately.
12. Immediate and effective measures shall be carried out to limit the spread of *B. vitiensis* from the containment area in the case of a unintended/accidental release from containment.

Inspection and monitoring requirements for containment facilities

13. The Authority, or its authorised agent or properly authorised enforcement officers, may inspect the facilities at any reasonable time.
14. A log of all *B. vitiensis* in the containment area shall be kept at all times.

Implementation of Controls

15. The person in charge of the maintenance in containment of *B. vitiensis* shall ensure that all relevant personnel are aware of the requirements to maintain *B. vitiensis* in containment and to prevent its unintended/accidental release.

The Environmental Risk Management Authority reached a decision on the following application on 20 June 2001

Application Code: GMC01004

Applicant: University of Auckland

Purpose: To import into containment three strains of genetically modified mice in order to study the pathogenesis of neurological disorders and possible therapeutic strategies

Description of Organisms: *Mus musculus* Linnaeus (mouse, GM, K/O) Dopamine D1 receptor gene knockout
Mus musculus Linnaeus (mouse, GM, K/O) Dopamine D2 receptor gene knockout
Mus musculus Linnaeus (mouse, GM) B6CBA-Tg-Tet-ON-RAGE

Decision: Approved with Controls

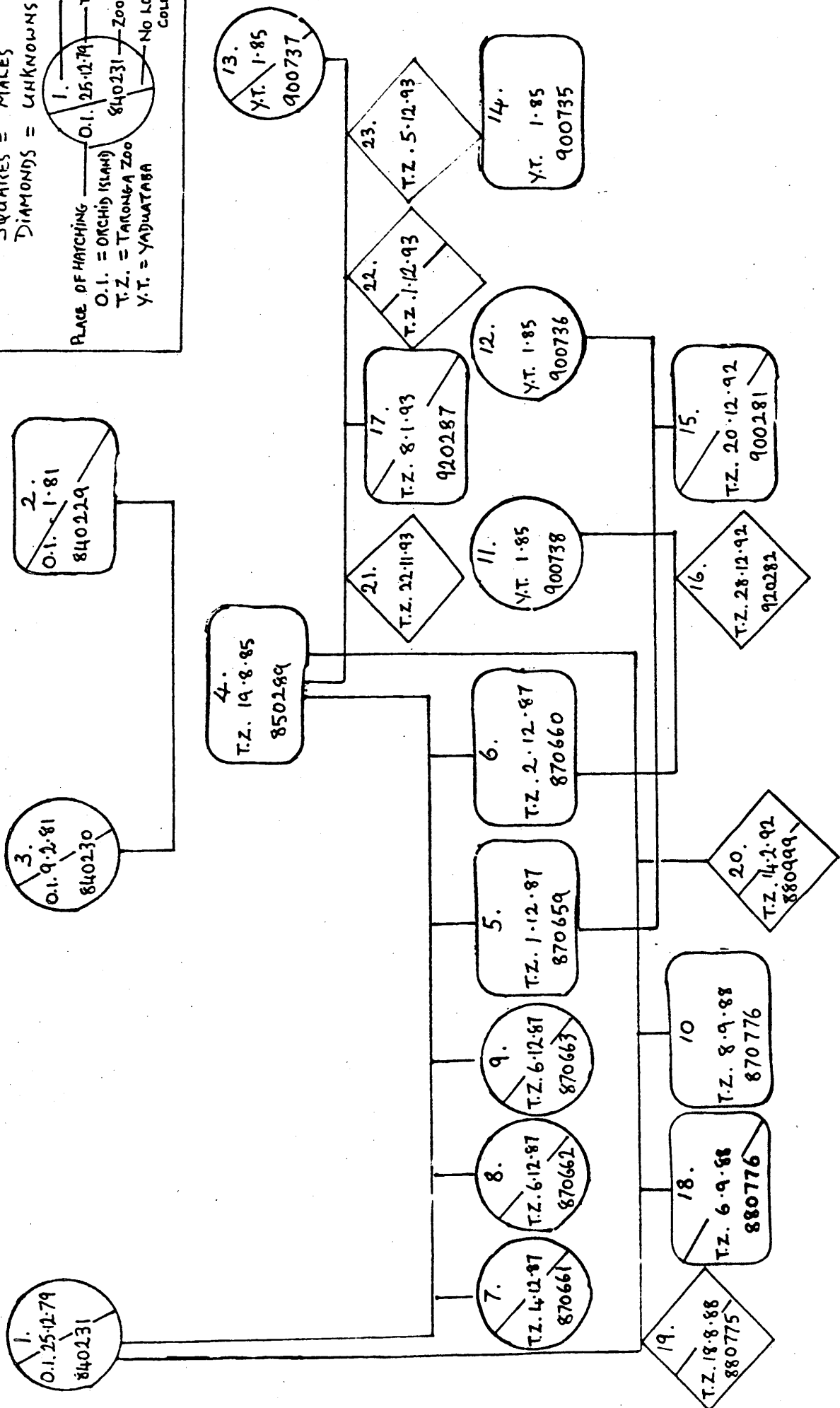
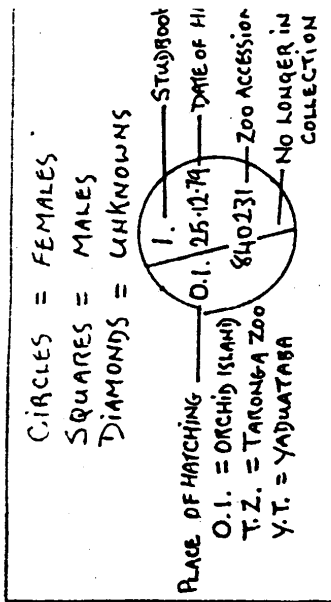
ERMA Approval Codes: GMC001098-GMC001100

Controls:

In order to provide for the matters detailed in the Third Schedule Part I *Containment Controls for Development and Field Testing of Genetically Modified Organisms*¹ of the Act, the Authority's approval of this application is subject to the following.

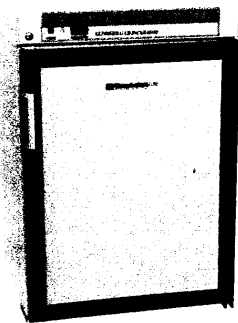
¹ Bold headings refer to *Matters to be Addressed by Containment Controls for Development and Field Testing of Genetically Modified Organisms*, specified in the Third Schedule of the HSNO Act 1996.

GENEALOGY CHART FOR DRACHYLOPUS

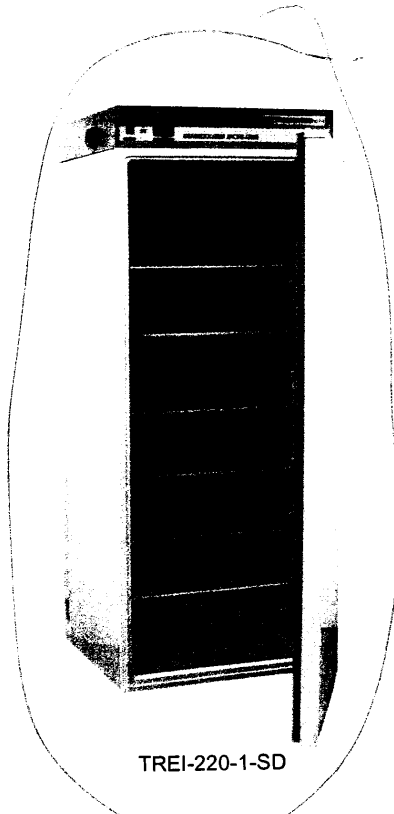


ECONOMY REFRIGERATED INCUBATORS

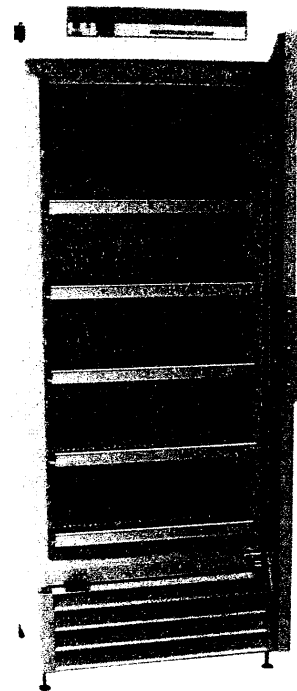
+5°C to +45°C



TREI-140-1-SD



TREI-220-1-SD



TREI-400-1-SD

FEATURES

Three models of Precision Economy Refrigerated Incubators are available. These have modern styling with attractive white enamelled steel exteriors and white PVC interior liners with an internal fluorescent light. (manual switch)

They have forced air circulation providing good even temperature distribution.

The incubators come standard with a solid door. The 220ltr and 400ltr models have an acrylic inner door. (This inner door not practical on the 140ltr model.)

Temperature is controlled by a digital solid state controller.

Shelves are PVC coated and are fully adjustable.

CONTROL STABILITY: $\pm 0.25^{\circ}\text{C}$

ORDER CODE	DIM. INT HxWxD cm	LITRES CAPACITY	DIM. EXT HxWxD cm	SHELVES	ELECTRICAL 240V 50Hz	WEIGHT Kg
TREI-140-1-SD	69x50x42	140	94.5x60x65	3	4A	55
TREI-220-1-SD	105x47.5x42	220	169x59.5x62	4	4A	95
TREI-400-1-SD	139x57.5x42	400	203x70x61	5	5A	100

*Specifications are subject to change without notification.

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9 Tarlington Place, Smithfield NSW 2164 Australia.
 PO. Box 6862, Wetherill Park Delivery Centre,
 NSW 1851 Australia.
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 Fax: (02) 9725 1706. Int.: 61 2 9725 1706.
 Email: sales@thermoline.com.au

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 Qld 4013. Australia.
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 Phone: (07) 3260 5243. Int.: 61 7 3260 5243.
 Fax: (07) 3266 3978. Int.: 61 7 3266 3978.
 Email: thermolineqld@thermoline.com.au
 Website: <http://www.thermoline.com.au>

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 PO. Box 1616 Preston Sth, VIC 3072 Australia
 Phone: (03) 9495 0898 Int.: 61 3 9495 0898.
 Fax: (03) 9495 0885 Int.: 61 3 9495 0885.
 Email: kevenbeekman@thermoline.com.au

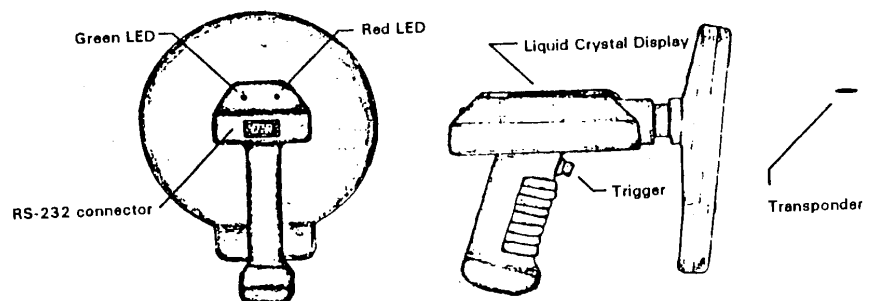
1. Description of Operation

1.1 System Overview

The Trovan identification system consists of a reader and a multiplicity of transponders. Using a magnetic field, the reader transmits to a remotely located transponder, and reads the unique identification code ("ID Number") permanently programmed into the transponder. Since the transponders are completely powered by the reader, they are maintenance-free and require no batteries. Each transponder is pre-programmed at the factory with one of 550 billion unalterable, unique ID-Numbers. This approach results in a tamper-proof system suited to a broad variety of identification applications.

The reader is capable of several modes of operation. These modes allow the operator to store readings in the internal non-volatile memory, as well as compare the ID number with others previously stored. This comparison feature provides a means to signal the operator when one or more desired transponders have been located within a larger group. As an added feature, the weekday, date and time at the instant of reading are stored along with the ID number in the reader memory.

The reader is actuated simply by depressing the single push-button "trigger" located on the handle. The reader is capable of communicating with an external host computer through an RS-232 data port located at the rear of the reading housing. This port allows the external computer to transfer ID numbers to and from the reader, as well as remotely control many facets of reader operation. In addition, the reader may be completely reprogrammed through this port, allowing reader software upgrades to be installed in the field.



Microchips

AUSTRALIA

PRICE LIST for Research / Zoo's etc
November 2005. Prices include GST.

Trovan ID100 implantable transponders (supplied sterile & pre-loaded in needle)

(multiples of 40)

0 – 40	\$9.90 each
80 – 120	\$9.57 each
160 – 1000	\$9.24 each
1040 – 2000	\$8.80 each
2040 – 5000	\$7.70 each
5040 – 10000	\$6.10 each
10040 +	P.O.A

ID 100A Micro Transponder (NOT supplied in needle or sterile)

1000 - 2000	\$8.40 each
2001 - 5000	\$7.15 each
5001 - 10000	\$5.95 each
10001 +	P.O.A

Implanters

Deluxe (IME)	\$ 46.75 each
Syringe	\$ 8.50 each

Hand Held Readers

LID560 pocket reader (no memory)	\$425.00 each	(Includes 9V battery)
LID570 pocket reader without cable/software	\$490.27 each	(includes 9V battery)
LID570 pocket reader with cable/software	\$583.00 each	(includes 9V battery)
Mini reader (read only)	\$635.00 each	(includes battery charger & belt strap)
Mini reader with database & software	\$725.00 each	(includes battery charger & belt strap)
LID503 boom reader	\$1,603.80	(includes battery charger)

Fixed reader Decoders

LID650/665 Fixed reader/decoder	\$1,174.30	(1 - 9 units)
(standard memory with time & date stamp)	\$ 986.50	(10 - 20 units)
	\$ P.O.A	(> 20 units)
Extended 512K EEPROM memory (additional)	\$ 94.50	
OEM option available 12V	\$ 370.00	(1 - 20 units)
	\$ P.O.A	(> 20 units)



Fixed reader Antennas

ANT CUST C300 (antenna alone) <i>with in/out sensor</i>	\$ 598.75	(1 - 9 units)
	\$ 498.96	(10 - 20 units)
	\$ P.O.A	(> 20 units)
ANT CUST C200 (antenna alone) <i>without in/out sensor</i>	\$ 598.75	(1 - 9 units)
	\$ 548.50	(10 - 20 units)
	\$ P.O.A	(> 20 units)
ANT610F (antenna alone)	\$ 777.00	(1 - 9 units)
	\$ 685.00	(10 - 20 units)
ANT612 (antenna alone)	\$2,086.50	(1 - 9 units)
	\$1,917.00	(10 - 20 units)
	P.O.A	(> 20 units)

Kits

LID570 Reader kit	\$643.72
<i>(includes LID570 pocket reader, Software, manual, Swann Infralink Infrared Communicator)</i>	

Ancillary

Scanner hire per day	\$ 4.95 <i>(subject to availability)</i>
Scanner hire per month	\$ 33.00 <i>(subject to availability)</i>
Keyboard Wedge Software	\$291.50 <i>(suits Minireader & LID500)</i>
Software & cable to suit LID570	\$ 92.73
RELAB127 sealed re-chargeable lead acid battery <i>(to suit LID650/ANT612 battery powered unit)</i>	\$ 74.50 each
RELAB carry bag <i>(to suit RELAB 127 battery)</i>	\$ 33.70 each
RELAB charger <i>(240V battery to charge RELAB 127 battery)</i>	\$ 71.50 each

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