Husbandry Guidelines
for

Blue-tongue Lizard

Tiliqua scincoides scincoides

Scincidae

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- # OCCUPATIONAL HEALTH AND SAFETY RISKS

Exhibiting the Blue-tongue Lizard (*Tiliqua scincoides)* falls into the **low risk category** (innocuous). However caution should be taken at all times, and especially throughout the breeding season (October to December) when males are more aggressive.

In the even of an attack, the lizard could inflict a bite or scratch that could lead to Tetanus, or a chronic infection at the wound site, so handlers are recommended to keep their tetanus shots up to date.

Any bite wounds should be thoroughly cleaned and disinfected and antibiotics prescribed if necessary. Gloves should be worn when cleaning out enclosures and/or coming into contact with faeces, as Salmonella sp. bacteria could be present. Symptoms of Salmonella infection include fever, diarrhoea, nausea and stomach pains. Seek medical advice if these symptoms occur.

Some lizards are prone to mites which could lead to Rickettsial diseases; signs and symptoms will differ slightly depending on the type of Rickettsia infection. However, like many viral or bacterial infections, most patients present with fever, headache and malaise (generally feeling unwell), and a widespread rash (or exanthem) of some description.

Treat lizards for mites and always wash hands with a good antibacterial soap after handling.

Always remember to wash your hands!

F10SC is what we use at work to spray on our hands before and after handling the lizards. It is a highly effective veterinary disinfectant, that kills bacteria, viruses and fungi. It is also used in the enclosure clean and for the customers when we let them touch certain animals. The product is considered safe for animals and people but if there are any concerns, always read the manufacturer's instructions.

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1 Introduction

Blue-tongues

A True Blue Aussie battler

Blue-tongue lizards are found in just about every part of Australia - on the coastal plains, in the mountains, in rainforest and deserts, with at least one species are found in every Australian capital city.
So, whether you live in Kakadu or Melbourne, just about everyone should be able to see one in their neighbourhood.

The Eastern Blue-tongue Lizard is of a silvery grey colour with black bands across its back and tail. They have long bodies that taper to a pointy tail which is smaller than their bodies.
The underbelly of these skinks is of a pale colour. They can grow to a length of about 60cm. They have short legs with small toes. Eastern Blue-tongue Lizards have large heads.
The eyes are small and of a reddish colour. Tongues of Eastern Blue-tongue Lizards are, of course, blue. These lizards are amazing survivors of urbanisation.
A lizard may stay in the same backyard for years, conveniently consuming slugs and snails and sunning itself each morning by the backdoor, or out under the clothesline. They are large and slow moving, travelling at a speed of between 1 to 5 km an hour.
Recent radio tracking research at the University of Sydney has revealed that individual Blue-tongues can travel through more than 15 backyards and cross several roads daily in search for a fellow lizard, or to find new niches or to shelter from predators. In Australia there are six subspecies of the Blue-tongue lizard.

Blue-tongues have a heavy body, short legs and a short fat tail. The most unusual thing about them is their blue tongue. When frightened, the blue-tongued skink opens its mouth and sticks out its tongue as a warning. Australian cities are the only major cities in the world that have resident lizards this size – adults can grow up to 60 cms in length.

Herpetologists, though, are now concerned that Blue -tongue numbers in some locations may be in decline, as a consequence of snail bait, cats, dogs, mowers and cars.

Blue-tongued lizards are extremely popular pets, and are increasingly becoming even more so. They have wonderful temperaments, and even seem to enjoy being handled, though I have found each lizard is a total individual in from temperament to food preferences.
They breed fairly easily and they display interesting social behaviour like courtship, threat and recognition. They all have their own different personalities, but they are not as alert as their dragon cousins.
This species was first described by John White, in *Journal of a Voyage to New South Wales, 1790.*

Please note:
All Australian lizards are protected species in Australia.
Seek individual State &Territory requirements for information on legal keeping of reptiles.

1.1 ASMP Category

Yes, it is listed on page 233 on the 2010 regional census plan.

1.2 IUCN Category

Is not listed.

1.3 EA Category

- You will need to apply for a Class One licence which is for easy-to-handle reptiles. You can apply to the National Parks and Wildlife Service within your state. It will cost you about $36 per year.
- You must apply for a permit through National Parks and Wildlife before moving the lizards, then fill out a Disposal Form through D.P.I.

1.4 NZ and PNG Categories and Legislation

N/A

1.5 Wild Population Management

N/A

1.6 Species Coordinator

- I and another keeper are the coordinators of the Blue-tongues; making sure the records are up to date and keeping an eye on food intake, housing, enclosure management and health monitoring.

1.7 Stud Book Holder

- At the moment we do not have a Stud Book on the Blue-tongues, as we have not been breeding Lizards.

2 Taxonomy

2.1 Nomenclature

Eastern Blue-tongued Lizard

Wikipedia

Scientific classification

Kingdom:	Animalia
Phylum:	Chordata
Class:	Reptilia
Order:	Squamata
Suborder:	Sauria
Family:	Scincidae
Genus:	**Tiliqua**
Species:	***T. scincoides***
Subspecies:	***T.s. scincoides***

Trinomial name

Tiliqua scincoides scincoides

2.2 Subspecies

Northern Blue-tongued Skink (*Tiliqua scincoides intermedia*): belonging to the same species as the Eastern Blue-tongue, this form is at home on the savannahs of Australia's tropical regions
Western Blue-tongued Skink (*Tiliqua occipitalis*): listed as vulnerable
Centralian Blue-tongued Skink (*Tiliqua multifasciata*): listed as vulnerable
Blotched Blue-tongue (*Tiliqua nigrolutea*): another species from the southwest, this one is restricted to the highland areas. It looks slightly different, being dark brown with light coloured blotches across the back.

Shingleback (*Tiliqua rugosa*): the Shingleback has many names e.g. Bob-tailed Lizard, Sleepy Lizard, Pinecone Lizard or Stumpy-tailed Lizard. It can be found west of the Great Dividing Range. It is the most unusual looking of the Blue-tongue lizards with its very short, stumpy tail and large rough scales. The Shingleback is dark brown, with or without blotches.
Pygmy Blue-tongued Skink (*Tiliqua adelaidensis*): as you probably guessed, the Pygmy Blue-tongue is a little fellow, growing to about 90 mm. It was considered to be extinct until it was rediscovered near Burra (mid-north of South Australia). The species is confined to that very small area north of Adelaide and is listed as endangered.

2.3 Recent Synonyms

- Tiliqua scincoides — COGGER 1983: 191
- Tiliqua scincoides — COGGER 2000: 580

2.4 Other common names

- Common Blue-tongue Lizard or Bluey

3 Natural History

- The Blue-tongues are large terrestrial, diurnal, omnivorous, viviparous skinks, which is to say they live on the ground, are active by day, feed on both animals and plants and give birth to live young.

- Blue-tongues belong to a lineage that dates back at least 15 million years, the Eastern Blue-tongue has long been known to science.

- This species was the first Australian reptile to be described- by Hunter in 1790; *scincoides* means 'skink like'. Eastern Blue-tongues occur throughout eastern and northern Australia where they occupy a wide variety of habitats ranging from temperate lowland grasslands, dry sclerophyll forest, semi-arid grassland and woodland, and coastal heaths. They can attain total lengths of up to 600 mm.

3.1 Morphometrics

3.1.1 Mass and Basic Body Measurements

- Length (head to vent): 290mm
- (Head to tail): 470mm
- Body width: 80mm
- Head width:55mm
- Head length: 80mm
- Weight for a full grown male: 601grams
- Weight for a full grown female: 457grams

(Note: These are average measurements. All measurements may vary depending on the individual)

3.1.2 Sexual Dimorphism

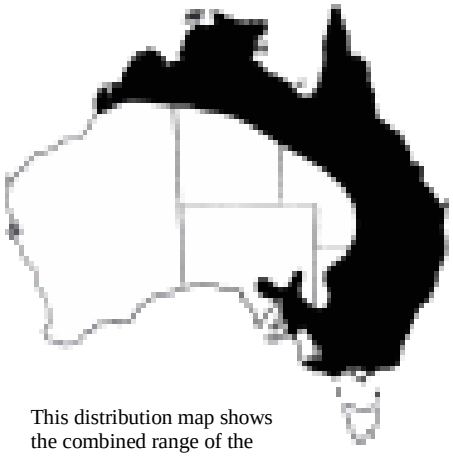
- In adult Blue-tongues, the difference between males and females can be quite pronounced: females are generally longer, have larger bodies than males and relatively smaller and narrower heads.
- In females the head may actually be dwarfed by their large bodies, whereas in males the head appears more in proportion to the body or they can even have a 'boof' head appearance. These differences do not become apparent until the lizards are close to adult size and may not always be so clear cut.
- A popular myth is that the sex of Eastern Blue-tongues can be determined by looking at belly colouration, with orange belly colour indicating females and blue indicating males. This has been proven to be incorrect.
- Sometimes just by putting two lizards together you can observe how they react to each other e.g. if one is a male and the other is a female, the female will often wag her tail, while the male will stay completely still. This should only be done by someone who knows what they are doing, because they may become aggressive.

Male or Female? Comparing heads and bodies.

3.1.3 Distinguishing Features

- *Tiliqua scincoides* is one of the largest skinks with SVL (snout-vent length) reaching 400mm. The tail is short and robust, measuring up to 60% of SVL. The limbs are pentadactyl and small, with hind legs measuring 20% of SVL. The head is relatively large, bearing strong jaws with a wide gape. There is differentiation in the tooth structure whereby the front teeth are smaller than those along the mid jaw line. The tongue is large and cobalt blue.
- Distinguishing features that separate *T.scincoides* from all other *Tiliqua* species are the anterior temporal scales that are large in size. The ear apertures are conspicuous. Colouration: *T.scincoides* occurring in tropical Queensland district lack the temporal (nostril-ear) black band that is characteristic in the southern end of the cline. Colour patterns vary, (the three I work with are all totally different in brightness and colour). Some individuals have banded markings and others have blotchy markings.
- The general colour patterns include a white ventrolateral surface. The head is a pale brown/grey and decreasing in intensity posteriorly. Dorsal transverse pale markings as well as oblique dorsolateral black markings interrupt this colouration. Alternating with this arrangement are wide yellow/orange large bands/blotches. The limbs are tertiary grey. This colour patterning is not unique to the Townsville region and variations do occur in colour and pattern.

3.2 Distribution and Habitat



This distribution map shows the combined range of the Northern Bluetongue and the Eastern Bluetongue.

- The Eastern Blue-tongue occurs throughout much of New South Wales, west to about Cobar. In the Sydney region, the Eastern Blue-tongue occurs on the coastal plain and in the lower Blue Mountains.

- Blue-tongues usually live in open country with lots of ground cover such as tussocky grasses or leaf litter. They shelter at night among leaf litter or under large objects on the ground such as rocks and logs.

- Early in the morning Blue-tongues emerge to bask in sunny areas before foraging for food during the warmer parts of the day. Like all lizards, Blue-tongues do not produce their own body heat, and rely on the warmth of their surroundings to raise their body temperature. Blue-tongues maintain a body temperature of about 30°C - 35°C when active.

- During cold weather they remain inactive, buried deep in their shelter sites, but on sunny days they may emerge to bask, or even end up in a backyard.

- Many people I know have had a Blue- tongue turn up in the backyard or have caught one eating the dog's food.

3.3 Conservation Status

- Unfortunately, Blue-tongues will eat snails and slugs poisoned by snail baits and can be poisoned themselves. Care should be taken in using snail baits and insecticides when blue-tongues are living in a garden. Blue-tongues can squeeze through small holes in and under fences, and garden pests can also cross fences, so chemicals used by neighbours can also affect your Blue-tongue.
- Look out for Blue-tongues when mowing long grass! They will try to escape the lawn mower by hiding in the grass rather than running away. Blue-tongues like to bask on warm surfaces, and black tar roads which warm up quickly in the sun "lure" many to their deaths.

The Eastern Blue Lizard is not on the IUCN Red List category

3.4 Longevity

- Blue-tongue lizards can live for a very long time (e.g. around 20 years for an Eastern Blue-tongue and up to 50 years for a Shingleback). Sexual maturity is reached in 2 years. Lizards will continue to grow their whole life; however once they have reached adulthood, their growth rate slows down considerably.

3.4.1 In the Wild

- The life span can vary greatly in the wild, with many Blue-tongue young not making it to adulthood depending on conditions and predators (especially dogs and cats). Snail baits and mowers are also not Blue-tongue friendly.

3.4.2 in Captivity

- With an adequate supply of healthy food, vitamins and good husbandry, Blue-tongues are known to live to about 20 years or more in captivity. With most animals kept in captivity, if anything doesn't look right physically they are taken immediately to a vet for treatment, which doesn't happen in the wild.

3.4.3 Techniques Used to Determine Age in Adults

- The best way to know the age of your Blue-tongue is through good record keeping as there is often no exact way of knowing its age. A good indication is the size of the lizard as a lot of the larger ones can range from 7 years to in the 20s.

4 Housing Requirements

4.1 Exhibit/Enclosure Design

- The cage must be of sufficient size to provide enough space, both horizontally and vertically, to enable the animals to take exercise and offer protection from any undue dominance or conflict.
- The cage must be large enough so that there is s temperature gradient, with one end being warmer than the other to allow the animals to thermo regulate.
- Keepers should have easy access to the interior of the enclosure for cleaning and for catching and handling the lizards.
- Even though Blue-tongues are terrestrial they can climb, so it's advisable to have lids on the enclosures.
- Safe materials should always be used when constructing an enclosure (no toxic paint or treated pine).
- Personally I find placing a Blue-tongue in an outside enclosure is healthier for the animal as they are prone to pacing and/or standing up at the door which can result in back injuries.

This was an old, run down echidna pen that was renovated to mimic a mini back yard with growing plants the lizards like to eat. The netting is a must as wild birds will injure or even worse kill the lizards. I now have a BT living full time in this enclosure completely out of her inside enclosure and of any artificial heat.

4.2 Holding area design

- Holding areas for lizards can be smaller than the actual display enclosure but must still allow the lizard to freely move around, with adequate heat and appropriate substrate. In temporary enclosures a shoe box makes a handy makeshift 'hollow log'.

4.3 Spatial Requirements

- Minimum floor area for 2 adult specimens = 2.5L x 2.0L (L = length of longest specimen); for each additional specimen add 20% to the area.
- Lizards under 12 months of age are exempt from the space requirements shown above, as appropriate enclosure dimensions for such lizards can vary greatly.
- Overcrowding must be avoided at all times. These considerations notwithstanding, such lizards must still be provided with all the other conditions set out in this Code.

4.4 Position of Enclosures

a) Outdoor enclosures are usually only suitable for species from a similar climatic region to that of the enclosure location, as they provide a natural regime of climatic and seasonal conditions.

b) Outdoor enclosures must not be dug below ground level unless there is provision of adequate drainage, notwithstanding clause c), because of the possibility of flooding or muddy conditions following rain.

c) The walls of outdoor enclosures must be constructed of smooth, non-climbable barriers and should continue into the ground not less than 50 cm to prevent reptiles from escaping by burrowing out.
The walls of the enclosure should be of sufficient height to prevent escape.
A 45 return, angled inwards on the top of the wall, will also help prevent climbing reptiles from escaping.

d) Shrubs must not be placed close to the enclosure walls, but situated away from them to prevent reptiles using them to escape.

e) Enclosures must be constructed so as to prevent unsupervised people from contacting the animals contained within.

f) Outdoor enclosures must:

- provide access to direct sunlight throughout the day;
- provide adequate hiding facilities for all reptiles housed within;
- provide adequate shade at all times of the day;
- be well drained to prevent the accumulation of water and facilitate dehydration of the substrate;
- Provide areas which are permanently covered and dry.

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4.5 Weather Protection

- There should always be adequate cover against rain, wind and sun for the lizard to seek shelter. Tussocks and plenty of hollow logs will ensure the lizard is protected from the elements and always make sure any outside enclosure has good drainage.
- I actually have a box within the enclosure the lizards go into at night and I lock them in as I have found rats like to harass them at night, even as far as one lizard having its tail bitten off.

4.6 Temperature Requirements

- The preferred temperature is around 25 I've actually slowly decreased the temperature over a 2 week period so the BT can be placed outside in a more natural habitat
- Most reptiles won't feed if the temperature drops to below 20 as they cannot digest their food which can be very detrimental to the animal's health.

4.7 Substrate

- Butchers' paper and Critter Crumble

4.8 Nest Boxes and/or Bedding Material

- Many things can be made into a nesting box for your lizard-a large hollow log would suffice, you could make something fancier, or even a small thick cardboard box with an opening cut out makes a great house for the Blue Tongue with soft leaf mulch inside (which they love to lie on top of) .
- Butcher's paper layered in the box is great for easy cleaning and shredded paper is good for them to get under. Newspaper is good insulating material for underneath.
- There is also a great new substrate called Critter Crumble. I haven't used this yet, but I hear it's an excellent substrate to use, and environment and keeper friendly.

4.9 Enclosure Furnishings

- Furnishings would include plants (non toxic to the animal), a sturdy flat rock (to help slough and to bask on), a hollow log, making sure it is big enough so the lizard doesn't get stuck in it, and a shallow water bowl that they can bathe in as well as drink from. Using heat rocks isn't recommended as the lizard can get burnt.

http://www.dpi.nsw.au

5 General Husbandry

5.1 Hygiene and Cleaning

- Once a week the whole enclosure is thoroughly cleaned out, and any rocks or logs are scrubbed, sprayed with F10, and left for 10 minutes to dry. All paper and mulch is removed and discarded, the enclosure is then vacuumed out, wiped over with a warm wet cloth then sprayed with F10, left for 10 minutes then wiped dry.
- Fresh paper is laid out with new mulch. Cleaned rocks/logs and clean water bowls are put back in and any browse is replaced with fresh. Be careful what you clean out the enclosures with and make sure it's lizard friendly.

5.2 Record Keeping

When housing Blue-tongue Lizards, detailed records should be kept on the following:

- **Identification:** This involves species, name, sex and any unusual identifying features on the lizard.
- **Parentage:** Any available information on the lizard's parents.
- **Previous History:** Any information from previous owners and/or copies of veterinarians reports.
- **Current Environment:** How the lizard is housed, where the enclosure is located, current diet, any other lizards kept in the environment, what types of disinfectants you are using and general husbandry practices**.**
- **Observation and Symptoms:** Any unusual symptoms or abnormal behaviour patterns, condition of faeces, changes in diet, or any recent exposure to unusual circumstances or environmental factors such as stress or chemicals.
- **Veterinary Examinations:** Reason for exam, vet findings and any operations or treatments provided.
- **Reproductive Stage:** Condition, behaviour (they are more aggressive when it's mating season so handlers should take extra care), date of mating, diet changes.
- **Shedding:** It's especially important to note this as I'm still treating a shingleback that had a bad leg and having those records on hand, the vet and keepers were able to establish that it had what is called 'banding', which is related to shedding.
- **Movements:** Within the park or between institutions.
- **Size and Weight Measurements:** Record dates of measurements from snout to vent (SVL), and weight.

Once this information is gathered together in one place it becomes very useful for the management of each individual animal and can also provide insights into the species in general.

5.3 Methods of Identification

- We identify the reptiles at my work with names on their enclosures (which are numbered). I also have photos of each lizard on its records and they each have their own carry boxes (with the lizard's name on

the box). Working with the Blue-tongues every day you do learn to recognize who is whom by visual identification e.g. Lucky has very bright colouring and a huge male-looking head, Jasmin the female is quite dark, and Geoffrey lost its tail and so has a stumpy regrown tail.

5.4 Routine Data Collection

- Routinely I check the lizards all over checking eyes, mouth and overall look of the lizard (the more you are around your lizard the quicker you are at picking up signs of things not right).
- I record if the reptile is going out to be sunned for the day, if they have urinated or defecated and whether or not they have eaten. The Blue-tongues are also weighed and measured once a month and this is recorded into the daily diary and into the animal's personal records.

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6 Feeding Requirements

6.1 Diet in the Wild

- In the wild Blue-tongues are omnivorous; they eat a variety of fruit, flowers, worms, insects, snails and berries. As Blue-tongues aren't very fast compared to some skinks, they are 'opportunist' hunters i.e. if they can catch it they will eat it.
- Blue-tongues require a balance of Insects (crickets, cockroaches and mealworms), snails, slugs or earthworms, and a variety of plants

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6.2 Captive Diet

- In captivity a mix of green and red vegetables is offered (spinach, coloured lettuce, tomato, red or green peppers, mushrooms, grated sweet potato and carrots). Fruits are also loved by the Blue-tongues. Grapes, apples, pears and rockmelon, occasionally some boiled egg can be added to the mix. Finely chop all of these ingredients, add a 1/3 of cat food, sprinkle with rep-cal supplement and mix thoroughly.
- It is important to also remember that in the wild, reptiles are "opportunistic" feeders and will eat all they can find at one feeding session. In captivity they will tend to eat all that is provided to them and could become obese and sluggish if overfed, which eventually will cause health problems.
- If an animal seems to be putting on too much weight then food should be withheld for several days to allow it to absorb what it has already eaten. A fat lizard isn't a healthy lizard.

6.3. Supplements

- Rep-Cal calcium and mineral powder. I use this with every feed by sprinkling a pinch over the made up mixture stirring through. Don't over use this and always read the manufacturers instructions.

6.4 Presentation of Food

- Food is best offered to Blue-tongues in the late morning through to midday, after they have had time to move around and have become active.
- Food can be left in the enclosure until the Blue Tongue has finished eating. I remove the bowls around 3pm. It is best to remove leftovers that day as you don't want the food going off causing health issues.
- Blue-tongues prefer their food in a shallow bowl so they can access the food easily, as they aren't the most nimble of lizards.
- Feed juvenile Blue-tongues 5 times per week with the same diet the adults eat. Just mash it up a little bit more.
- While adults can be fed up to 3 times a week, in colder weather Blue-tongues should be fed only 2 times a week. Pinkies (baby euthanased mice) can also be fed to Blueys occasionally. When the lizards are put into their sunning area I supply snails for them to hunt and we have planted a small garden bed there with edible plants such as strawberries, bokchoy, dandelions and marigolds.
- Water dishes should be shallow, stable and replenished everyday. I've found that when Blue-tongues are shedding they like to have a swim in their water bowl, so check on this, as at times they can empty the water out.

7 Handling and Transport

7.1 Timing of Capture and Handling.

- Capture should take place in the evening or morning when the lizard is at its calmest. It is also best when there is no public.
- Food should be withheld for 24 hours before the journey, no water, unless it is hot conditions and a long journey. Mist sprays are good for hot dry conditions.

7.2 Catching Bags

- Catching bags must be made with double cloth. A pillowcase inside another case works fine.

7.3 Capture and Restraint Techniques

- I find putting the lizards into a double pillow case then into a pet pak works fine for traveling.
- When catching the lizard I always let it know that I am there as they don't like being shocked and surprised any more than we do.
- As with most Blue-tongues, they are normally a cruisy animal and are easy to handle, but in the rare case of a very aggressive lizard, using a towel to capture them works well.

7.4 Weighing and Examination

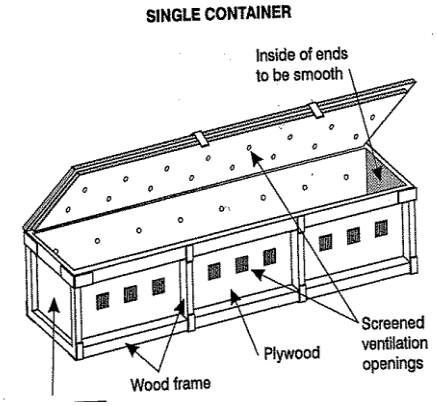
- Place a plastic container (large enough to contain the lizard) and deducting the weight of the container, gently place the Blue-tongue in the container, and always being cautious the lizard doesn't try to climb out, record the weight. Study closely the following:
  - Scales: Are they even and not lifting.
  - Eyes: Are they clear and not watering.
  - Nostrils: Note any discharge (remember small white powdery looking substance is usually the lizard removing the salt from its system).
  - Is the lizard moving freely?
  - Mouth: Is it even and sealed.
  - Toes and nails: Are any broken or need a manicure.

7.5 Release

- Always release the lizard with head directed in the area of its log/nest box, putting the Blue-tongue down gently allowing it to slowly walk off and find cover to relax. Again the best time for release is in the morning, giving the lizard time to adjust.

7.6 Transport Requirements

7.6.1 Box Design



7.6.2 Furnishings

No furnishings are needed, but crumpled paper in the box is suggested to stop the lizard from sliding around.

7.6.3 Water and Food

Water can be offered but no food at all, and it is best to transport the lizard 24 hours after its last feed.

7.6.4 Animals per Box

One Blue-tongue Lizard per box is recommended as they can badly injure each other if stressed.

7.6.5 Timing of Transportation

Timing is best in the morning in the cool of day and before the park opens.

7.6.6 Release from Box

Release from the box is best first thing in the morning giving the lizard plenty of time to adjust itself in its surroundings and to find a place to settle for the night.

How to handle a Blue-tongue Lizard:

Always support the lizard as they feel insecure when their whole body isn't supported. I personally like to have my thumb and finger on either side of the head (as shown in the picture above) to be able to control the lizard. Even though they are usually an easy reptile to work with they can have their grumpy days.

8 Health Requirements

8.1 Daily Health Checks

Daily observation health checks would include:

- **Is the lizard eating**
- **Faeces; is it too runny or too hard**
- **Is the lizard drinking**
- **Sloughing (maybe needs a bath)**
- **Check heating is on correct temperature**
- **Is the lizard's mobility normal**
- **Are scales all smooth and no bumps**
- **Is the lizards gait normal**

8.2 Detailed Physical Examination

- First thing to look at is the lizards nostrils, are they open and clear, or do they have water or mucous in them, take in account if the lizard has just had a big drink it could have a little water in the there as the nostrils are connected to the internal part of the mouth. Some lizards have little deposits of white powder in their nostrils, this is a salt build up and they will sneeze this out.

- Next thing to look at is the lip line making sure it is sealed this is very important, if you see it raised up in any area this is more than likely the beginnings of infection, which will have to be addressed. The eyes need to be looked at to make sure there is no tearing, although in air conditioning this is likely to occur. Make sure they are fully open to full size and clear. sometimes they do become a little cloudy when the lizard is about to slough, but it could also mean an infection, especially if just one eye is cloudy. Mouth infection can affect the eye due to the little canal that runs from the mouth to the eye, be sure to treat both if this happens.

- Then the ears need to be checked as ectoparasites like to get in there. If so treat the animals. Check the scales are laying down flat.

- Check the cloaca, making sure it isn't protruding.

- Toes: Are they strong and healthy. Make sure none are broken and nails aren't split or too long.

- It is also a good idea to weigh the lizard once a month to monitor it is at a healthy weight.
- At slough time pay attention to the legs and toes as 'banding' could occur (skin caught around the leg or toes which restricts and could cause the loss of a leg or toes). Bathing them at this time is a good idea to help remove shedding skin.

8.2.1 Chemical Restraint

The following drug, if used, should always be administered by a veterinarian:

- **. Ketamine MS22**
- **15-25mg/kg (IM)**
- **40-88mg/kg (sterile soln)**

8.2.2 Physical Restraint

- To be honest I've found Blue-tongues very easy to handle. As long as they feel supported they will be quite relaxed. They don't seem to enjoy being held in the middle and this will cause them to struggle.
- T o handle an aggressive lizard I have used a towel with great success. It also seems that if their eyes are covered they are calmer.
- It's always easier to use 2 people when wanting to exam a Blue-tongue closely; one to hold the reptile while you both check things out.

8.3 Routine Treatments

- T he best prevention in any health problems is good hygiene and husbandry.
- Worm the lizard every 3 months and check for lice. Treat the Blue-tongue when sloughing with a tepid bath, as if old skin remains, it can constrict the blood flow to the limb resulting in deformities. I also weigh our lizards monthly to monitor the condition.

8.4 Known Health Problems

Metabolic Bone Disease

- MBD is usually caused by one simple thing: A lack of variety in the diet. Essentially, it comes down to a lack of calcium, and/or a Calcium/Phosphorus imbalance. Many fruits are rich in phosphorus. So, if you feed your blue tongue mainly fruits, he's likely not getting the calcium he needs. Same with any food. VARIETY is key. Lack of any UV lighting (including the sun) can also be a factor.
- In reptile language, MBD is actually somewhat similar to the human version of the disease, "osteoporosis" which in a nutshell, is a weakening of the bones.
- There are a large number of symptoms including stunted growth, softening of the bones, lumps on the back or tail, a jerky walking motion or labored movement, shaking or little twitches in the legs & toes (which means the nerves have been affected), violent convulsions, and it can even become so advanced as to affect the internal organs, cause partial or full paralysis, and even bone fractures. In the case of partial paralysis, your skink will probably walk with its front legs, but drag its entire body behind him.

Respiratory Problems

- Respiratory infections can occur in Blue-tongues, but usually it is nothing to worry about if you have a clean terrarium, good diet, and most importantly, correct temperatures and humidity. Stress can also be a factor with respiratory infections as well as many other complications. Major temperature changes like removing it from a warm enclosure/box and placing it outdoors when it's cold) can also be a cause, as well as extreme humidity. Try to keep your humidity in the 25-45% range, and never above 50%. Symptoms of a respiratory infection can include gasping, wheezing, coughing, heaving (very heavy breathing), and mucus leaking from the eyes, nose, or mouth. Remember, sneezing is normal unless it's suspiciously excessive (don't be paranoid, they will sneeze more when burrowing in their substrate). Heavy breathing is also normal after a big meal, especially if you have a fat skink. Most infections will require veterinary treatment. Be VERY mindful of obvious problems, because often Blue-tongues will not show excessive symptoms until it's too late.

Internal Parasites

- **Treatment:**
  Worms are treated by Ivermectin 0.2mg/kg by mouth. This drug is toxic to Turtles and should not be used in that species.
  Panacur 25 at 25-50mg/kg by mouth is also used for worms.
  Protozoa are treated with Flagyl 40mg/kg once daily for 5 **days**

Toe Gangrene

- **Cause:** Low humidity, crushing injury, fungal infection.
- **Clinical signs:** Toes appear dead – feel hard, not flexible, or toes are absent and stumps remain. Retained skin is present around swollen toes.
- **Treatment:** Amputation of toes may be required. Soak toes in dilute iodine for its antifungal/antibacterial action. Antibiotics are required for 2 weeks as a minimum
- **Prevention:** Correct humidity level**.**

Hypothermia

- **Cause:**
  Failure in heating:
  Heating provided, but below the PBT.
  Placing in a freezer as a method of restraint or anesthesia.
- **Clinical signs:**
  Discharge from eyes and nose.
  Not eating, due to inappropriate fermentation of food in gut.
- **Treatment:**
  Slowly warm the animal to PBT over 3 hours.
  Antibiotic course may be required to treat infection.
- **Prevention:**
  Monitor the cage temperature daily with a thermometer.

Gout

- **Cause:**
  Reptiles fed a high proportion of dog or cat food.
  Antibiotics (such as Gentamicin) are toxic to the kidney.
- **Clinical signs: Occurs in two locations:**
  Visceral gout (gout affecting the organs): not eat, dehydrated, lethargic
  Articular gout (gout affecting the joints): swollen joints, lameness, quiet.
- **Treatment:**
  Give fluids to flush the toxic compounds from the body.
  Reduce protein in diet. Remember that many lizards are vegetarian/omnivores – Not carnivores.

8.5 Quarantine Requirements

- When exporting the Blue Tongue Lizard overseas the quarantine laws and requirements vary depending on which country it is to be exported to. To find out these requirements call Quarantine on (02) 833474444. You will also need to contact National Parks and Wildlife to ask about the permits.
- It is good practice to quarantine animals on arrival when they are to be added to the existing collection. As a guide, zoos would provide a 30-day quarantine period for most species.
- During this period the lizard should be checked for endo and ectoparasites. Always use gloves and spray with f10 before and after handling the lizard. Make the quarantine as close to the lizard's habitat as possible with plenty of places for the animals to seek shelter and hide away (the key is to keep the lizards as stress free as possible). Record everything from food intake to observing the faeces and any behaviour (good and bad).

9 Behaviour

9.1 Activity

Depends on the weather and time of year:

- Winter: The lizards are not moving much at all, choosing to stay in their nest box/house.
- Summer and Spring: They are a lot more active and are found basking in the sun, foraging for the snails I throw in the enclosure for them, or nibbling on flowers.

9.2 Social Behaviour

- Blue-tongues don't like to socialise except when they come together for breeding and even then they can be aggressive towards each other (especially the female).Yet they get along fine with humans and have a very mellow personality especially the ones people have made a pet- seeming to recognize their owner/keepers.

9.3 Reproductive Behaviour

- The male will get a little more aggressive during this time though but not as bad as the female. Some breeders have been known to tape the female's mouth to stop any bad injuries happening to the male.
- The male will stay very still observing the female.
- She will start to wiggle her tail. He will then approach her, nudging her side then biting at her neck to hold her, and to try to get her in a good position so he can then mate with her.

9.4 Bathing

- Bathing the lizard in tepid water helps greatly when the animal is sloughing. Make sure that whatever you use to bathe the lizard is nice and secure (you don't want the animal toppling out), with one hand securing the lizard gently.
- Whoosh the water over its body removing any pieces of skin that are coming off easily, paying special attention to the legs and toes to prevent banding (don't tug at any skin that is still connected). When finished, dry the body thoroughly and return lizard to its enclosure. A good plan is to have the drying towel ready.

9.5 Behavioural Problems

- As with all animals they each have their own personalities, some being more aggressive than others. The time to be more aware of this is breeding time and turning to bite the keeper. Always watch for this and approach the animal with caution. I've found letting them know you're going to pick them up is a lot better than just grabbing them by surprise.

9.6 Signs of Stress

- Loss of appetite, laboured breathing, weight loss and constantly hiding are all signs of stress and need to be addressed immediately.

9.7 Behavioural Enrichment

- In the outside sunning enclosure I have planted edible flowers and plants that the Blue-tongues like to eat, like bok choy, marigolds and strawberries. I also place snails around the enclosure encouraging them to forage. It's like a mini backyard with lawn and their own little cubby house.

9.8 Introductions and Removals

- It is recommended that Blue-tongues don't share the same enclosure. Even though they can look like they are getting on, at one point they will fight. The only occasion to place them together would be to breed and even then you should never leave them alone.
- Removing the female after mating is a good idea, then putting her back in the next day and repeating this until breeding time is finished.

9.9 Intraspecific Compatibility

- Being a solitary animal, it is not a good idea to put Blue-tongues together as this can cause fights to happen, resulting in bad injuries or even death. Even though we have had lizards together that lived peacefully for years yet I keep reading from many experts that they will eventually end up fighting (which is something no owner/keeper wants).

9.10 Interspecific Compatibility

- Yes you can house Blue-tongues with certain other species like the Eastern Bearded Dragon, Cunningham's Skink and a few others as long as there are plenty of visual barricades and each lizard has its own territory .e.g. Cunningham's Skink could have rocks with plenty of hidey holes as Blue-tongues don't like to climb high, and if each has its own space and territory they should all be fine. Just keep an eye on the timing of births if any mating has occurred, as reptiles will eat the young of other species.

9.11 Suitability to Captivity

- Blue Tongue Lizards adapt very well to being in captivity, even becoming familiar with the keepers. They are a mellow animal to deal with and usually only aggressive at breeding time. Just about every child in Australia (well 20 years ago) has had a pet Blue-tongue at one time or another and knows what great pets they make, but remember you do need that permit.

10 Breeding

10.1 Mating System

- Blue-tongues live alone for most of the year, but between September and November(this can vary in different climates).
  males pursue females and mating occurs, At this time, males may fight aggressively

- Mating may be rough, with females carrying scrape marks from the male's teeth especially on the neck area.

- Female Blue-tongues give birth three to five months after mating, between June and April. The Eastern Blue-tongue usually gives birth between December and January. This species is able to breed every year if it has sufficient food.
- At birth, the young eat the placental membranes and shed their skin for the first time within a few days. The young are ready to look after themselves straight after birth and disperse within a few days.

10.2 Ease of Breeding

- Breeding Blue-tongue Lizards in captivity is relatively easy after the animals have been through brumation (Brumation is similar to mammalian hibernation. It is the period of time that lizards will enter a period of inactivity during the cooler months).
- Blue-tongues will usually bury themselves in soil or leaf litter, and stay there until the weather warms up again. On the Sunshine Coast lizards in outdoor enclosures will usually not enter a period of true brumation, but rather just slow down over winter.
- Lizards kept indoors also will not usually enter brumation.
- Although it is important for some reptiles, brumation is not necessary to maintain the health of Blue-tongues. It is however often needed to induce breeding. So with the weather warming up and the lizard out of brumation, start off with small feeds, as giving the lizard large feeds after brumation can cause the lizard to bring the food back up.
- When the reptile is feeding well, place the female into the male's enclosure and watch them carefully. The male will stay very still and the female will wag her tail. The male will approach the female nudging her side and if all goes well he will the bite at her neck to get her into the right position. The female will raise and move her tail to the side with the male putting himself into position to then mate.
- It is recommended to remove the female after mating, returning her the next day to breed again, and repeating this for the next 5 days.

10.3 Reproductive Condition

- If raised properly, captive bred Blue-tongued skinks will breed at about 2years old. The animals must be healthy and have a good fat store in their tail. Males generally have wider heads and their bodies when viewed from above have straight sides. Females have a less bulky head and more rounded sides. This is not often obvious and the only sure way is to wait and see who gives birth.

- The breeding season is in early spring. To induce breeding they should be cooled to 13-18C for 2 months. Mating will take place within a few weeks of the warming.

- The males often become aggressive during mating and fights may break out. It is usually better to keep the animals separate and bring them together to mate. This will usually occur immediately and the pair can be separated again.
- It is better to reintroduce the animals on a regular basis as single matings are seldom successful. During mating the male bites the female around the neck, this will result in bite marks and torn skin. The male will twist his tail under the females to enable mating to occur.

10.3.1 Females

Need to be at least 2 years of age and be healthy with plenty of fat in the tail.

10.3.2 Males

As with the female the male needs to be a healthy specimen. The males, however, are ready to breed at a younger age.

10.4 Techniques Used to Control Breeding

The best technique to control breeding is to have the animals separated.

10.5 Occurrence of Hybrids

The deliberate cross-breeding (hybridisation) of captive reptile species and subspecies is not considered to be a desirable aim for the management of captive reptiles. In order to prevent possible genetic contamination of captive and wild populations, species or subspecies capable of hybridising must be housed separately. We never allow the Northern Blue-tongues in the sunning outside enclosure with the Easterns.

10.6 Timing of Breeding

(Greer 1989: Bauer 1993: Shea 1998) For most of the year Blue-tongues remain solitary. During spring (Sept-Nov) females enter their oestrus stage and are courted by males. Any male-male encounters are usually aggressive and can involve combat.

10.7 Age at First Breeding and Last Breeding

Adulthood is attained at 3 years of age. Blue-tongue Lizards are long lived and can live as long as 25 years in captivity. I have read about a breeder having a 20 year old lizard that is still breeding.

10.8 Ability to Breed Every Year

Eastern Blue-tongues are able to breed every year if they have sufficient food, but other species of Blue-tongue may often skip a year.

10.9 Ability to Breed More than Once Per Year

Eastern Blue-tongues don't breed more than once a year.

10.10 Nesting, hollow or other requirements

A sturdy cardboard box for privacy works very well for the birth. Butchers paper works well as it keeps the young free of debris and easy to clean up after the birth.

10.11 Breeding diet

- Keep feeding the adult Blue-tongues as written in the Diet in Captivity section, making sure to add minerals e.g. calcium- feed this 3 days a week, offering snails as well and making sure the female has plenty of fat in her tail and a healthy body.

10.12 Incubation Period

- 100 days. Generally they give birth in mid-summer.

10.13 Clutch size

- They all vary from lizard to lizard - anything from 6 to 32 babies, each measuring 130-140mm (total length) and weighing between 10-20 g.

10.14 Age at weaning

- Blue-tongue babies are weaned the minute they are born,

10.15 Removal from parents

Blue-tongues are viviparous (live bearing) and the embryos have a placenta that is similar to that of mammals. No form of parental control is present in this group and the neonates are precocious from the onset. Once born, they ingest their membranes, gather some energy then would be on their way. As keepers this is when we move them to their prepared enclosure/box.

10.16 Growth and development

Foods high in calcium should be favoured as these lizards need a good supply of calcium for bone growth. However, your Blue-tongue will have his own ideas on his diet and often develops distinct dietary preferences. Calcium supplements are a good idea for growing Blue-tongues. As with most reptiles, growth will depend on good diet and conditions e.g. warmth.

11 Artificial Rearing

11.1 Incubator Type

- As the Eastern Blue gives birth to live young this does not refer to them.

11.2 Incubation Temperature and Humidity

- N/A

11.3 Desired % Egg Mass Loss

- N/A

11.4 Hatching Temperature and Humidity

- N/A

11.5 Normal Pip to Hatch Interval

- N/A

11.6 Diet and Feeding Routine

- I fed our baby Blue-tongues 5 times a week using the same diet I feed the adults just a little more

11.7 Specific Requirements

- Using a heat source is suggested if the young have been born in an heated box even a normal light bulb can work, though always make sure the babies have a gradient as to not over heat. though if the young were born outside and the weather is warm, Its fine to keep them outdoors just ensuring they have places to go for cover.
- Supply fresh water daily preferably in a sturdy shallow bowl.

11.8 Data Recording

- Record keeping is very important in a captive institute for example wherever these babies end up the owners will know their exact age (which is a bonus)
- Weight and measurements should be taken regularly and dated the day you do this.
- Breeding details e.g. parents details, birth details and litter size.

11.9 Identification Methods

- With sometimes up to 15 young being born it is very hard to visually identify them but as they grow you will notice they have different pattern a picture of each young noting the band pattern is how I personally would use identification.

11.10 Hygiene

- Always wash you hands before and after handling the lizards
- Remove any food that’s been smeared around (as they do)

- Depending on the amount of young per box I would replace clean paper daily as they as they can be very messy.

11.11 Behavioural Considerations

- A couple of hours after birth some BT babies will get aggressive towards each other Ive found they can actually inflict wounds on each other this is where it is recommended to have more that one nursery box prepared, as soon as they are born the instinct to open their mouths is there though its so cute its laughable

11.12 Weaning

- T he Eastern Blue-tongue mother does not wean her young as soon as she has finished giving birth she leaves the young to defend on they're own.

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15 Glossary

- Viviparous – Reptiles giving birth to live young.
- Cloaca-posterior opening that serves as the only such opening for the intestinal, reproductive, and urinary tracts

16 Appendix

ANNUAL CYCLE OF MAINTENANCE FOR THE EASTERN BLUE-TONGUE LIZARD

(Tiliqua scincoides)

January	1	2		4	
February	1		3	4	
March	1			4	
April	1		3	4	
May	1	2		4	5
June	1			4	5
July	1			4	5
August	1			4	5
September	1	2	3	4	5
October	1			4	
November	1		3	4	
December	1	2	3	4	

1. Raking out enclosure
2. Replace with new bedding
3. Trim and remove old leaves in garden
4. Search for any live insects
5. Remove leaves/sticks from netting