



# Box Turtle Pet Care

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- ▶ Vital statistics, Sexing, Housing
- ▶ Temperature, Lighting, Diet
- ▶ Blood collection, Fluid therapy
- ▶ Common disorders, Physical exam

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# Box Turtles

Two species and six subspecies of the North American box turtle (*Terrapene carolina*, *T. ornata*) occur in the pet trade. These turtles are primarily terrestrial with fixed home ranges. Hunting and foraging occur primarily in the mornings and late afternoons during hot weather. Box turtles hibernate during the winter except in the southerly portion of their range. Most Asian box turtles (distantly related to North American species) are semi-aquatic.

## PET POTENTIAL/BEHAVIOR

- ▶ Relatively small size and attractive.
- ▶ Responsive to owners; will accept food fed by hand.
- ▶ Shy (at least initially), mildly social animals, but do well living alone in captivity.
- ▶ Long-lived if properly cared for.

## SEXING

- ▶ The tail of the male is often longer and wider at the base than in the female.
- ▶ The cloaca of the male is more caudal (further from the shell and closer to the tip of the tail) than the female's when compared with the rear edge of the plastron.
- ▶ Males often have a concavity in the caudal half of the plastron.
- ▶ The iris of the mature male is frequently red, while in the female it is usually brown, yellowish brown or auburn.
- ▶ Females typically have a higher-domed carapace.



## VITAL STATISTICS

Life span	Free-ranging	under 50 years
	Average captive	20+ years
Body weight	200-600 g	
Shell length	3.5-8.4 inches (9-21 cm)	
Diet	omnivorous	
Sexual maturity	males	4-6 years
	females	5-7 years
Breeding season	spring/early summer	
Clutch size	2-7 eggs; avg 4-5	
Incubation period	50-90 days	

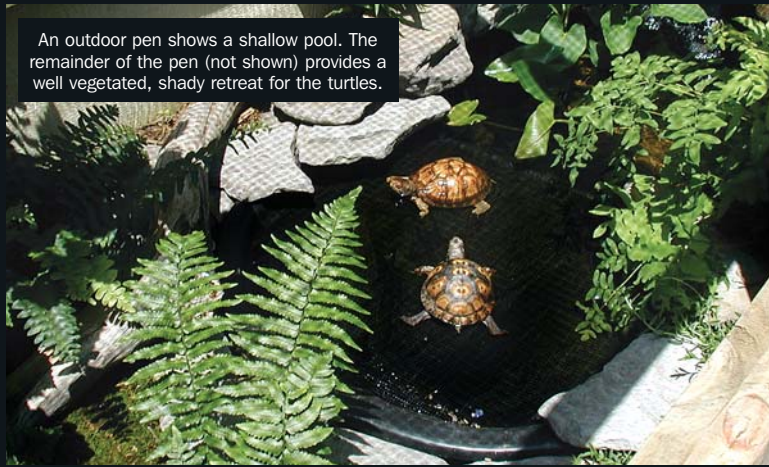
The red color of the iris in this western box turtle denotes a male.





An indoor enclosure is shown with the proper substrate, pool, plants and lighting.

George Gral, National Aquarium in Baltimore



An outdoor pen shows a shallow pool. The remainder of the pen (not shown) provides a well vegetated, shady retreat for the turtles.

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## Box Turtles

### HOUSING

- ▶ Indoor enclosures should be at least 48 x 24 x 15 inches (120 x 60 x 38 cm) for one adult box turtle.
- ▶ Males and females should be housed separately.
- ▶ Where the climate is appropriate it is better to house box turtles outdoors.
- ▶ Enclosure walls should be a minimum of 12-15" (30-40 cm) high to prevent escape from climbing walls.
- ▶ If housed outdoors, walls should have an inside lip at the top and extend at least 15" (38 cm) above the ground and at least 10" (25 cm) into the ground to prevent escape (turtles are capable of climbing over or digging under a fence).
- ▶ Finely shredded hardwood mulch or high quality loam compost are appropriate substrates.
- ▶ Hardwood leaves, rehydrated sphagnum moss or rehydrated coconut shell is recommended to increase moisture. Substrate moisture content is very important in the health of a box turtle.
- ▶ Live or silk plants and smooth pieces of wood should be added for a retreat from overexposure to ultraviolet light and for environmental enrichment.
- ▶ Providing opportunities for exercise and a substrate (3-4" deep) for digging will help maintain the turtle's health.

### TEMPERATURE

- ▶ Daytime background temperatures should be 72-75°F (22-24°C) and several degrees cooler at night.
- ▶ A daytime basking area heated from above by a radiant heat source or lamp (85-88°F [29-31°C]) is essential.



## Box Turtles

- ▶ Access to sun for basking is ideal.
- ▶ An under-tank heater designed for reptile enclosures should be used in a different area from the basking site.

### LIGHTING

- ▶ A diurnal cycle of 12-14 hours of light and 10-12 hours of dark is ideal.
- ▶ UVB full spectrum lighting must be provided 10-14 hours per day with bulbs replaced every 9-12 months.
- ▶ When outdoors, a hollowed log, slanted board or heavy vegetation will protect from excessive direct sunlight.

### WATER

- ▶ Box turtles must have daily access to water for drinking, soaking and eliminating wastes.
- ▶ Fresh water should be provided in a shallow container no deeper than  $\frac{1}{4}$  the shell height (many are weak swimmers).
- ▶ Because turtles tend to defecate in water, fastidious cleaning of water containers is essential.
- ▶ Most Asian box turtles do best in semi-aquatic habitats. The terrestrial keeled box turtle is the exception.

### DIET

- ▶ Box turtles are omnivorous, and opportunity often dictates what they eat in the wild.
- ▶ High quality, pesticide-free vegetable and animal sources of food should be provided.
- ▶ Vegetables should be finely diced and mixed together to prevent selective feeding.

Box turtles are omnivorous; however, western box turtles are more insectivorous than eastern box turtles



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### MEAL 1

#### Ingredients (per turtle):

- Rehydrate 1 Tbs of dry "Turtle Brittle" (www.enasco.com), a fish/meat/grain-based chow, in 2 tsp of water.
- Add ½ Tbs of a hard squash from List A.
- Add ½ Tbs of a vegetable from List B.
- Add ½ Tbs of a leafy green from List C.
- Add ½ Tbs of a fruit from List D.
- Several times a month add 1 tsp of crumbled, hard-boiled egg.
- Mix all of the above ingredients together well so the turtle is less likely to focus on a single food item.
- Top with a few berries from List E.
- Top with 1-2 freshly killed crickets or mealworms.
- Dust the entire meal very lightly with pure calcium carbonate (sold as a supplement for humans; the pills must be crushed) or finely crushed cuttlebone (about 85% calcium carbonate)

### MEAL 2

#### (per turtle):

- Serve as every third meal for eastern box turtles
  - Serve as every other meal for ornate box turtles
- Feed to satiation:**
- Pesticide-free slugs
  - Terrestrial snails
  - Grubs
  - Earthworms
  - Beetles
  - Sow bugs
  - Crickets (cultured crickets should be gut-loaded with high calcium cricket diet for at least 2 days before use)
  - Grasshoppers
  - Preying mantids (remove pincers)
  - Katydid
- Feed occasionally:
- Mealworms
  - Super mealworms (*Zophobas* beetle larvae)
  - Pre-killed pinkie mice

#### Foods to include in vegetable portion of box turtle diet

List A	List B	List C	List D	List E
Grated and very finely diced <ul style="list-style-type: none"> <li>■ Acorn squash</li> <li>■ Butternut squash</li> <li>■ Pumpkin</li> <li>■ Winter squash</li> </ul>	Very finely diced <ul style="list-style-type: none"> <li>■ Sweet potatoes</li> <li>■ Carrots</li> <li>■ Red/orange bell peppers</li> <li>■ Okra</li> <li>■ <i>Opuntia</i> cactus pad (no spines)</li> </ul>	Very finely diced <ul style="list-style-type: none"> <li>■ Clover and blossoms</li> <li>■ Collard greens</li> <li>■ Dandelions (all parts)</li> <li>■ Endive</li> <li>■ Escarole</li> <li>■ Romaine</li> <li>■ Watercress</li> </ul>	Very finely diced <ul style="list-style-type: none"> <li>■ Apples</li> <li>■ Apricots</li> <li>■ Figs</li> <li>■ Grapes</li> <li>■ Mango</li> <li>■ Melon</li> <li>■ Oranges</li> <li>■ Papayas</li> <li>■ Peaches</li> <li>■ Tomatoes</li> </ul>	<ul style="list-style-type: none"> <li>■ Blackberries</li> <li>■ Blueberries</li> <li>■ Elderberries</li> <li>■ Gooseberries</li> <li>■ Raspberries</li> <li>■ Wild strawberries</li> </ul>

This list is far from complete, but represents a reasonable variety of commonly available foodstuffs that are palatable and nutritious. Try to vary which items are used from each list. Be sure that any field-collected foodstuff has not been exposed to harmful chemicals.

### Box Turtles

- ▶ All insects should be lightly dusted with a phosphorus-free calcium power every other meal, and a high quality multivitamin supplement once a week.
- ▶ Hatchlings and juvenile turtles should be fed daily. A blender may be used to dice their food especially finely to ease ingestion.
- ▶ When box turtles reach adulthood it is practical to feed them only once every other day.
- ▶ Turtles should be fed in the morning.
- ▶ Mature turtles will eat pinkies, and Asian turtles enjoy chopped goldfish, which should be offered occasionally.
- ▶ Foods should be offered on flat rocks or a plastic lid to prevent substrate ingestion. Each animal should be provided its own food dish.
- ▶ Leftovers should be removed to prevent spoilage.
- ▶ Free-roaming animals are at great risk from dietary indiscretion.

### RESTRAINT

- ▶ Box turtles rarely need significant restraint during exam.
- ▶ Cranial exam is easier with an assistant restraining the forelimb from behind.
- ▶ Once presented, the head is controlled with the thumb and forefinger.
- ▶ Place thumb under carapace and the middle fingers on the other side midway on the carapace; be prepared for a pinch.
- ▶ If poked or prodded, they usually do not retreat into their shell but may occasionally bite or pinch an unwary finger between the carapace and plastron as it slams shut.

Barnett, S.L., Whitaker BR: Indoor Care of North America Box Turtles, Exotic DVM 6(1):23-29, 2004.



## Box Turtles

## BLOOD COLLECTION

- ▶ Recalcitrant individuals may require minor sedation for successful blood draws.
- ▶ The most common sites are the dorsal tail vein (dorsal venous sinus), jugular vein, subcarapacial (subvertebral) sinus, brachial venous plexus and occipital sinus.

## FLUID THERAPY

- ▶ Oral: esophagostomy tube or oral speculum 25-35 ml/kg/day divided in 2-3 treatments.
- ▶ Subcutaneous: in the loose skin of the front or rear legs near the shell margin.
- ▶ Intracoelomic: needle inserted in prefemoral fossa and parallel to plastron.
- ▶ Intraosseus: tibia or medullary cavity of the plastro-carapacial bridge. Secure with tissue glue and tape.

## PHYSICAL EXAMINATION

- ▶ The first visit should consist of a complete physical examination including full captive history and baseline weight.
- ▶ Take a case history of the client's husbandry protocol, including diet, housing, temperature, humidity and lighting.
- ▶ A fecal examination (direct and flotation) should be performed to rule-out protozoan and nematode infections.
- ▶ A thorough examination of the skin and all accessible recesses will reveal ectoparasites (bots, ticks), signs of trauma, or bacterial or fungal infections.

Alternatively, box turtles may be restrained by holding at the rear end of the carapace, but the turtle may struggle.



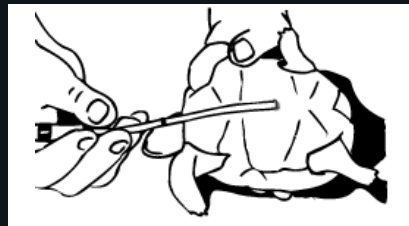
Peter Fisher, DVM

HEMATOLOGIC/  
BIOCHEMISTRY  
REFERENCE RANGES

RBC	2.35-7.55 x 10 <sup>6</sup> /μL
PCV	27-38%
WBC	6-15 x 10 <sup>3</sup> /μL
Hbg	5.9 g/dl
Total protein	4.5 g/dl
Glucose	22-36 mg/dl
Uric acid	2.1-10.0 mg/dl
Na	130 mEq/L
K	4.7 mEq/L
Mg	3.5 mEq/L
Cl	108 mEq/L
Phos	1-5 mg/dl
Ca	7.5-11.8

Values vary with sampling site, ambient temperature, gender, stress, seasonality and laboratory used. Clinicians are encouraged to use a laboratory familiar with reptilian blood samples.

The length of stomach tube for oral dosing is measured and marked. The tortoise is held upright to allow the esophagus to straighten out for insertion of the tube.



Excessively long nails and an overgrown beak are frequently seen in box turtles with inappropriate husbandry.



The natural habitat of the western box turtle shows that they prosper in very harsh conditions. Hiding in burrows, bushes or logs protects them from withering daytime heat.



## Box Turtles

- ▶ Special attention should be given to ocular discharge and a bubbly respiratory discharge (may indicate vitamin A deficiency often complicated by secondary bacterial problems), which is a common presenting syndrome.

### MOST COMMON DISORDERS

- ▶ Malnutrition
- ▶ Dehydration
- ▶ Bacterial infections/septicemia
- ▶ Ocular signs/discharges (may be related to vitamin A deficiency)
- ▶ Upper respiratory problems (may be related to vitamin A deficiency, poor husbandry and bacterial infection)
- ▶ Parasitism, both internal and external
- ▶ Metabolic bone disease (soft shell, overgrown beak, pyramiding of scutes, muscular weakness and an alteration in carapace conformation)
- ▶ Abscesses (especially aural abscesses)
- ▶ Trauma (shell damage, fractures, wounds, burns)
- ▶ Fungal infection of shell (may be dry or wet; affected area of shell is soft or crumbly, has odor, collapses, turns color)
- ▶ Beak deformities
- ▶ Swollen eyes (caused by excessively dry environment)

### ZOONOTIC POTENTIAL

- ▶ Like all reptiles, box turtles may be *Salmonella* sp. carriers. Hand washing and good hygiene after handling are essential.



## Box Turtles

## REFERENCES

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## WHAT TO LOOK FOR IN A HEALTHY BOX TURTLE



## AN UNHEALTHY BOX TURTLE

