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BOX TURTLE CARE

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Box turtles are a common reptile pet that with proper care can live 30 to 40 years and perhaps much longer. Unfortunately, they are among the most neglected reptiles in captivity, because most people just do not know how to care for them properly. The following are some brief guidelines on care of these beautiful creatures.

Box turtles usually are obtained as adults from the wild and can be difficult to adapt to captivity, although some individuals do well from the start. Veterinary examination is advisable for new pets. If healthy, new arrivals should be placed outdoors if the weather is favorable or set up in as large a cage as possible. It is easier to establish box turtles purchased in the spring and summer. From September through February many box turtles hibernate therefore this is a bad time to purchase them. Box turtles are naturally secretive animals and frequent handling or watching will deter them from settling into captivity. Several box turtles are common in the pet trade including the eastern box turtle, *Terrapene carolina carolina*, Gulf Coast box turtle, *Terrapene c. major*, Florida box turtle, *Terrapene c. bauri*, three-toed box turtle, *Terrapene c. triunguis*, the ornate box turtle, *Terrapene ornata ornata* and the desert box turtle, *Terrapene o. luteola*.

Twenty-gallon aquariums are the smallest minimum cage size for box turtles, consider larger aquariums (such as a fifty gallon) or make larger cages out of plywood or use concrete mixing containers available in most hardware stores. The bigger the cage the better. The bottom of the cage should be filled with humid substrates such as medium to large wood chips mixed with peat moss or a sand and soil mixture (not sand by itself). Drier substrates promote skin cracking and poor health. Substrates need to be completely changed every few months and feces need to be scooped out on a weekly basis. A hide box that the turtle can get under and out of sight is important. Many turtles prefer to sleep in them. Loose leaf litter can be spread in the cage.

It is best to provide a temperature gradient so that turtles can regulate their own body temperature. Box turtles are heliotherms which means they seek sunlight for heat. Basking areas can be provided by an incandescent light bulb (60 - 100 watts) with reflector hood directed at one end of the cage during the day. The cage should get no colder than 60°F at night and gradually warm to 80 to 90°F during the day. Lights should be turned off during the night, supplemental heat from heat tape

or heating pads should be provided under one-half of the cage if temperatures drop below 60°F. Background ambient temperature should be kept between 70 to 80°F. Hot rocks do not work well for turtles.

An easy to clean shallow water dish big enough that the turtle can get into it should always be available. Water depth should be no deeper than the turtle's chin when its head is partially retracted. Turtles may drown if submerged or overturned in deeper water. Florida and three-toed box turtles are better swimmers than other box turtles and can even forage underwater. Turtles prefer to defecate in their water bowl so it should be cleaned several times per week. Juvenile eastern box turtles are often much more aquatic than adults.

During the spring, summer and fall months box turtles should be outdoors in a back yard or a fenced enclosure. Make sure the outdoor quarter's perimeter is secure before the turtle is released into it. If there is any opening in the perimeter the turtle will find it and escape. Box turtles are good at digging under fences so seal

borders with bricks, rocks, boards, compacted soil, gravel or bury the fencing several inches. They also can climb over fencing less than 12 inches high. The outdoor quarters should have some shade in dense shrubbery, dry leaves or a wooden shelter so the turtles can escape the hot sun when needed. Bring turtles indoors whenever the temperature drops into the low 60's. Water should be available outdoors as well.

Dogs are fond of chewing on turtles and can wreak havoc in a few minutes. Do not leave box turtles alone with dogs. Small box turtles can be devoured without a trace. Raccoons and opossums will enter yards at night to prey on turtles. Secure caging with a screened lid is strongly recommended.

Box turtles are much more carnivorous than most people realize. Adult eastern box turtles are opportunistic omnivores consuming land snails, beetles, sowbugs or pillbugs, millipedes, slugs, earthworms, spiders, carrion, small mammals, birds, crayfish, frogs, tadpoles, salamanders, lizards, snakes, smaller turtles, and plant material such as mushrooms, strawberries, raspberries, mulberries, and tomatoes. Youngsters are primarily carnivorous. Ornate box turtles are mainly insectivorous consuming dung beetles, caterpillars, cicadas, and grasshoppers, but they also eat mulberries, leaves, tender shoots, and carrion. Unlike other box turtles ornates frequently utilize burrows and prefer more arid habitat such as open prairie.

In captivity long term nutritional problems are typical for most box turtles but difficult to appreciate. One can avoid nutritional diseases by feeding a well-balanced diet that is continually varied. Here is one recommended diet, items listed in bold print are box turtle favorites and will often stimulate feeding in finicky turtles. Keep in mind that different species have different dietary preferences, for instance ornates are much more carnivorous and thus less interested in plant material. Ornates often thrive on a mixed diet of insects and mice. Interpret these guidelines liberally.

50% ANIMAL OR HIGH-PROTEIN FOODS - **Earthworms, crickets, grasshoppers, cicadas, slugs, snails**, waxworms, mealworms, silk moth larvae, other insects, adult maintenance dry dog food, trout chow, **whole skinned chopped mice, baby mice (pinkies)**, goldfish, pelleted parrot food, pelleted turtle food, monkey chow biscuits, and sardines. Vitamin fortified chows (such as dog, monkey or parrot food) should be limited to less than 5% of the total diet because of the high vitamin, fat and protein content. All the dry chows should be soaked in water for 30 minutes to soften them. Avoid cat food because it is too high in fat and protein for reptiles. Do not add multivitamins to foods that are already vitamin-fortified. Feed a wide variety of animal and high-protein foods, not just a few of these items. Insects are calcium deficient and should be fed enriched diets and dusted with powdered calcium carbonate, lactate, citrate or gluconate just prior to offering them to the turtle (see handout of feeding insectivorous reptiles and amphibians).

50% PLANTS - 25% FRUITS AND 75% VEGETABLES

25% Fruits - **Tomatoes, strawberries, raspberries**, apples, grapes, cherries, peaches, pears, plums, oranges, nectarines, figs, **melons** (remove seeds), bananas, mangoes and grapefruit. Fruits are mineral deficient but tasty so they must be limited.

75% Vegetables - Dark leafy greens (mustard, collard, radish, beet and turnip greens or tops, kale, cabbage, spinach, red leaf or romaine lettuce, dandelions [leaves, stems and flowers], Bok-choy, Pak-choi, broccoli rabe), squashes, sweet potatoes, carrots, thawed frozen mixed vegetables (peas, corn, carrots, green beans, and lima beans), carrots (shaved, not chopped), alfalfa, radish, clover or bean sprouts, **mushrooms**, red, green or yellow bell peppers, broccoli, green beans, peas in the pod, okra, and prickly pear cactus pads (shave off spines). Wash fruits and vegetables and chop all items into bite-sized pieces. Some species are not fond of vegetables.

Box turtles have a continuous need for vitamin A-rich foods. Liver (in whole mice) is an excellent source of vitamin A as well as rich yellow or dark-orange-colored vegetables (carrots, sweet potatoes, butternut and winter squashes) and dark leafy greens (dandelion greens and flowers, spinach, turnip, and mustard greens). Steaming (not boiling) hard squashes makes them much more palatable and easier to chop.

Adults should be fed three or more times per week in the morning and juveniles daily. Every feeding dust food with calcium lactate, carbonate, citrate or gluconate. Every two weeks dust food lightly with multivitamins if

vitamin-fortified foods present are not eaten. Over supplementation with multivitamins is not healthy. Feed as much variety as possible to ensure a healthy balanced diet!

For finicky eaters, try some of their favorite foods (listed in bold print) and keep in mind that box turtles are particularly attracted to red, yellow and orange colored foods. Live, moving food will often stimulate feeding; pinkies and earthworms often entice the most recalcitrant specimens to feed. Box turtles are most active in early morning or late afternoon when it is not too hot, so these are good times to try and feed them. Rainstorms often increase activity, thus spraying their cage can stimulate appetite. When you find something they really like, mix it heavily into the salad and then gradually decrease it over a period of weeks. Bad dietary habits can be difficult to overcome and often require months to correct. Continue to offer foods even if they are not eaten initially, as they turtle adjusts to a varied salad it will gradually increase dietary diversity.

Hibernation is recommended for temperate northern box turtles such as *Terrapene carolina carolina*, *Terrapene c. triunguis*, *Terrapene ornata ornata*, but not *Terrapene bauri* or *Terrapene c. major*. Keep in mind that within a given species animals from warmer areas or ecomiches may not hibernate at all. Some box turtles may skip hibernation in captivity, especially if the conditions stay warm and the day length remains artificially long. Others may stop eating in the early fall regardless of artificial conditions. Hibernation is recommended for healthy specimens in good body weight. Veterinary examination several weeks prior to hibernation is advisable. Convalescing, underweight, or sick turtles (evidenced by swollen eyelids, sunken eyes, nasal discharge, laborious or gurgling respiration) should not be hibernated! Weight gain over the summer is a prerequisite for hibernation.

Frye recommends pre-conditioning tortoises with carbohydrate-rich foods such as steamed winter squashes, sprouts, alfalfa pellets and mixed fruits (figs, melons, apples, etc.) six weeks prior to the onset of hibernation. This seems reasonable for box turtles as well. Carrots and winter squashes are important to provide an adequate supply of vitamin A during hibernation.

Most hibernating turtles noticeably decrease their food intake as hibernation approaches. Water should be constantly available prior to hibernation, soaking encourages drinking. In September, October or November, or as soon as the turtle's appetite noticeably decreases in early fall, withhold food (but not water) for several weeks but keep the turtle between 70 to 80°F. This gives the turtle time to clear its gastrointestinal tract. After this, remove external heat sources and allow the turtle to acclimate to room temperature of 60 to 70°F. After a week at room temperature, the turtle should be ready to enter the hibernaculum.

Box turtles can be hibernated indoors or outdoors. For indoor hibernation, select an area that can be kept below 55°F for the winter such as a basement, garage, back porch, crawl space, or wine cellar. Use a minimum-maximum thermometer to check temperatures several weeks before hibernation. Persistent temperatures above 60°F are not cool enough for hibernation, and the turtle's metabolism will be high enough that it will slowly starve. Prolonged temperatures below 41°F are too cold, temperatures below freezing should be avoided.

A hibernaculum can be set up with a large box, crate, cooler, or aquarium with a foot of slightly humid peat-based potting soil and a three- to six-inch layer of shredded newspaper or dried leaves. The turtle should burrow into the soil and remain inactive. The soil should be humid, but not wet, so that the turtle does not dehydrate. Low humidity can be a problem indoors. Box turtles should be awakened every two to three weeks and allowed to soak in shallow 75°F water for two hours to insure adequate hydration. During soaking the turtle's eyes should re-open within two hours. If the turtle appears healthy, let it dry off then return it to the hibernaculum. If any signs of illness are present warm the turtle up to 80°F and seek veterinary attention as soon as possible. Contrary to popular belief disturbing turtles during hibernation is not harmful.

For outdoor hibernation select an area sheltered from the wind with several feet of loosened soil, loose soil near a foundation works well in colder areas. Spread a foot or two of loose leaves or hay over the soil. Be sure the area drains well and is not prone to flooding. The turtle will burrow into the soil and if all goes well should emerge in the spring. Do not disturb it while hibernating. Two to four months usually suffices for hibernation. Once the turtle becomes active in the spring it should be soaked in lukewarm water daily until it starts eating well within a week. If it doesn't start eating see your veterinarian.

Most species lay two to eight (normally four to six) eggs, from May through July. Multiple clutches are possible. Females can store sperm and lay fertile eggs for up to four years after fertilization. Females excavate nests with their hind legs from late afternoon to early evening and carefully bury their eggs. Eggs should be removed from nests for artificial incubation, keeping the same side up as when they were laid.

The most widely used incubation medium is vermiculite, available from most commercial nurseries, or plant sections of some grocery stores. One part vermiculite can be mixed with one part water (by weight) and placed in a sealable containers (to prevent evaporative water loss) such as plastic shoe boxes or Tupperware two quart, to one gallon, containers. Eggs should be half buried in the incubation medium and the container opened briefly weekly to facilitate air circulation.

An incubator is essential to provide stable warm incubation temperatures. A simple incubator can be made from a Styrofoam box raised above a heating pad until the desired temperature is achieved. Also an aquarium filled with water can provide stable heat from a submersible aquarium heater. A variety of other incubators can be purchased or fabricated. A safe incubation temperature range for most species is 82 to 86°F. Eggs hatch in two to three months if fertile.

Remember that once purchased the box turtle's care becomes wholly dependent upon you the owner. Box turtles make rewarding pets if properly cared for. Take the time to care for them correctly to ensure a long, healthy and happy life.