



Care sheet

for

Tortoises

Care of Tortoises

True tortoises are all members of the family Testudidae which encompasses 12 genera with 40 living species. Common species in the pet trade include

North American tortoises:

Desert tortoise = *Gopherus agassizi* Texas tortoise = *G.berlandier*
Bolson tortoise = *G.flavomarginatu* Gopher tortoise = *G.polyphemus*

Mediterranean and African tortoises:

Hermann's tortoise = *Testudo hermanni* Greek tortoise = *T.graeca*
Egyptian tortoise = *T.kleinmanni* Russian tortoise = *T.horsfieldi*
Marginated tortoise = *T.marginata*

Geochelone (contain largest tortoises) which are pantropic and do not hibernate include:

Red foot tortoise = *G.carbonaria* Yellow foot = *G.denticulate*
Argentine tortoise = *G.chilensis* Leopard tortoise = *G.pardalis*
Aldabran giant tortoise = *G.gigante* Spur-thighed tortoise = *G.sulcata*
Indian star tortoise = *G.elegans* Asian star tortoise = *G.platynota*
Galapagos tortoise (largest) = *G.elephantopus*

SELECTING A HEALTHY TORTOISE

Captive-bred tortoises are the ideal choice as they are generally disease free therefore posing less of a health hazard to other tortoises as well as their keepers. It also reduces the demand on the wild population and is a conservation-positive decision, too. If possible start off first by selecting a male as they make more responsive pets, are less shy, more brightly coloured and are considerably hardier than females (which can also have female-specific problems such as egg-binding). A healthy tortoise feels heavy, as if it is full with water rather than air. It should have clear eyes, no discharges and a firm fibrous oblong stool. If there are sick tortoises within the same enclosure, look elsewhere. Quarantine new arrivals for 6 weeks possibly longer if possible. African specimens are difficult to maintain and should be avoided unless you live in a very dry environment. The Impressed tortoise, *M.impressa*, requires a special fungus diet and captives often die.

CAGING/HOUSING

Whenever possible, tortoises should be kept outdoors even if it is for a small portion of the year, so that they may exercise, graze and bask in the sun (important for vitamin D synthesis). Tortoises kept outside require an area of shade even in the coolest climates or they cold overheat. Most like basking areas and a shallow (if too deep or difficult the tortoise may tip over) water pan large enough to allow soaking. Well-acclimated adult tropical tortoises can be housed outdoors when temperatures are: morning and nights above 18.5C (65F); midday above 24C (75F). Outdoor hazards include: predators (foxes, cats, dogs, fire ants), pesticides, scraps of metal, plastic, nails or wire may be ingested.

It is best to keep one species per enclosure, rather than an artificially mixed group combined of different species as each species has its own special needs. In addition, chances of breeding success are greater with all tortoises being of the same species. If keeping various species together ensure barriers such as rocks, logs or vegetation are available for tortoises to retreat from one another.

The floor area should be at least 10 times the area of the tortoise(s) or the combined shell size of all tortoises should not exceed $\frac{1}{4}$ of the floor space available. Perimeters should be secure and solid (at least up to eye level) as tortoises constantly pace and try to escape perimeters they can see through. Buried barriers up to twelve inches are needed to prevent underground escape and possibly deeper for burrowing species.

It is best to make an indoor enclosure long and narrow. Heat one end (between 85-95F°) for 12 hours using a full spectrum (UVA/UVB) heat lamp but always provide a cool end/area (indoor temperature should range between 24-32C°(75-90F°). Many tortoises like a hide box ('little house') which to hide (for outdoor enclosures a heated dog house should be considered where colder temperatures prevail). Alfalfa pellets are the ideal substrate for juveniles with a mixture of conifer bark and peat moss being used as they grow and are moved into larger enclosures. Acceptable alternative substrates include newspaper, hay, corrugated cardboard, clean soil or soil with a high clay content. Sand especially of silica composition, is likely to be eaten and could cause a fatal impaction. Providing a small amount of calcium rich sand (such as coral sand) or fine oyster shell is an excellent source of dietary calcium, as it is readily dissolved inside the tortoise. The following species require high humidity: *G.carbonaria* / *denticulata* / *gigantean* / *elephantopus* / *radiata* / *sulcata* / *platynotata* / *yniphora*, *Indotestudo elongata* / *forstenii*, *Manouria impressa* while desert species can tolerate higher temperatures and drier enclosures. Therefore an appreciation of the species natural history is important.

HIBERNATION

Hibernation is triggered by reducing ambient temperatures, reducing photoperiod and light intensity. Increasing temperatures alone reverses hibernation. Hibernating chelonia utilize fat and liver glycogen reserves over this period and lose .2-.4 g/day (about 1% of body weight per month; no more than 6-7% over the entire period). Tortoises typically hibernate outdoors for 5-6 months from mid-October until April while indoor hibernation being shorter from November to late February. Water is also lost via respiration and blood urea levels rise due to protein catabolism as the animal does not urinate. At these low temperatures there is a suppression of WBC function and production (also due to \uparrow urea) and antibody synthesis and therefore immunosuppression.

However, hibernation helps maintain normal thyroid activity and may help tortoises achieve their normal life expectancy. It is important in stimulating reproductive activity in males and synchronizes female ovulation. They are likely to mate about a month after emergence from winter hibernation, with females laying eggs 1 month post mating and eggs hatching by the end of summer. In addition, hibernating species cease to feed in the winter which can pose problems if the tortoise is not hibernated.

Tortoises may be hibernated indoors (in a cool basement, garage, back porch, wine cellar or north or east facing closet or window) or outdoors. Temperatures should stay between 10-16C (50-60F) with an occasional drop to 7C (45F). If temperatures are too high the tortoise may slowly starve. If you live in an area where cool winters are experienced and plan for your tortoises to hibernate naturally outdoors, a pit must be dug into the soil twice as deep as the frost level, and filled with mulch. This 'hibernaculum' should be dug on high ground where it can receive the morning sun. Healthy adult and near-adult tortoises should find and use the hibernaculum during late-summer and early fall nights. They will naturally extend their burrowing and hibernate but one should ensure they are covered especially on cool evenings. If

extreme cold weather is expected one should add hay, dirt or leaves as additional cover to prevent the tortoises from freezing. Young or ill tortoises should not be hibernated, but kept inside and fed well. Large tortoises should be awakened and soaked in water 24C (75F) for 2 hrs to ensure adequate hydration; smaller ones should be soaked every 2-3 wks (eyes should open within 2 hours). If any signs of illness are present the tortoise should not re-enter hibernation.

No tortoise absolutely needs to hibernate; it is simply a response to increasingly cold nights that allows survival. It is a stressful process at times and some tortoises freeze or otherwise die during it. When spring arrives, tortoises emerging from hibernation experience a massive rise in blood glucose from liver glycogen stores to fuel initial foraging. At this time they are likely to enjoy a soak and some treats such as watermelon, strawberries and/or tomato. As a general rule they must drink within 10 days and eat within 3-4 weeks of re-emerging. Try to avoid dry foods and ensure water is available at all times during this period as dehydrated tortoises may die from intestinal obstructions or simply from dehydration.

Post-hibernational anorexia is primarily due to inadequate conditioning (decreased deposition of fat) of tortoises the previous autumn. Other common problems on re-emergence include septicaemia, stomatitis, and blindness (due to cataract from excessive low temperatures). *T.horsfieldi* hibernates for most of the year in their natural habitat (which includes the USSR) being active for only 3 months (March-May). Tropical tortoises do not hibernate although many (especially *G.sulcata*) may become inactive during droughts (period is known as "estivation"). Others neither hibernate nor estivate such as the Red-footed tortoise (*G.carbonaria*) which may be kept outdoors as long as temperatures do not fall below 55F°.

Prior to hibernation:

- fecal analysis (2 mths prior): to allow for treatment if parasites present
- weight gain during summer (6 wks prior hibernation feed carbohydrate rich foods such as steamed squashes, alfalfa pellets & fruits)
- weigh tortoises
- withhold food 1 week prior hibernation (outdoor grasses may be consumed)
- ensure water available (soaking them may encourage them to drink)

On emergence one should:

- soak in lukewarm water
- correct dehydration
- give Vitamins
- maintain at a temperature of 30C°
- give easily assimilated food (normal eating habits return within 1-2 wks)

Hibernating species include:

T.hermannii, *T.graeca*, *T.horsfieldi*, *G.agassizii*, *G.polyphemus* and *G.berlandieri*

DIET

Correct balance of nutrients is important as malnutrition in tortoises may result in various conditions and disorders such as skeletal and/or shell abnormalities (metabolic bone disease), rubber jaw, osteoperosis, ocular lesions (swollen eyelids), kidney damage, anorexia. Tortoises require high dietary calcium levels exceeding phosphorus levels in order for proper absorbtion. Dandelion greens, parsley, kelp, watercress, celery and orange rind have high levels

of calcium and are low in phosphorus. Avoid offering too much cabbage and related vegetable as it can cause 'goiter'. Pesticide free grasses can provide roughage. Calcium supplements and tortoise chows are useful. A useful aid for indoor tortoises is to provide them once or twice a week with a teaspoon of high protein tinned cat food to provide vitamin D3 precursors to aid calcium metabolism. This is very important in tortoises not receiving adequate full spectrum ultraviolet light.

Adults should be fed 3 times per week and hatchlings fed daily. For every feeding dust food with calcium lactate, carbonate or gluconate. Every 1-2 weeks dust with multivitamins. A successful diet would include the following:

85% Vegetables: majority being dark leafy greens (mustard, collard, radish & turnip greens or tops, kale, cabbage, dandelions, bok-choy, broccoli, rape, back garden grasses, clovers, legumes and weeds). Mulberry & grape leaves, roses, nasturtiums, hibiscus, carnation flowers, cured alfalfa or timothy hay, soaked alfalfa pellets, thawed frozen mixed vegetables, peas in the pod, cauliflower, bean sprouts, jicama, green peppers, radishes, summer & winter squashes and green beans are good.

- Feed less of spinach, swiss chard, beet greens, red leaf or romaine lettuce

10% Fruits: grapes, apple, oranges, pear, prickly pear fruit, mangos, bananas, nectarines, apricot,

peaches, plums, dates, all melons, strawberries, raspberries and tomatoes. Increase to 20% for red and yellow footed tortoises.

<5% High-Protein Foods: dry maintenance dog food, primate chow, pelleted parrot chow, tofu, various cereals (bran/corn flakes, grape nuts, crisped rice), sardines w/bone, large carnivore diets and scrambled or boiled eggs (with shells). Increase to 10% for hinge-back, angulate, brown and impressed tortoises.