

The Best Way To Raise A Sulcata, Leopard, Or Star Tortoise

Tom Roach authored this care guide, downloaded from [www.tortoiseforum.org](https://www.tortoiseforum.org/threads/the-best-way-to-raise-a-sulcata-leopard-or-star-tortoise.181497/#post-1814517) 20 April 2020.
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Some light editing from Will Espenshade

I chose the title of this care sheet very carefully. Are there other ways to raise babies? Yes. Yes there are, but those ways are not as good. What follows is the BEST way, according to 30 years of research and experimentation with hundreds of babies of many species.

Babies hatch during the start of the rainy season. It is hot, very humid, rainy, and marshy in some areas. There are puddles and lush green growing food everywhere. In some areas there is a dry season, but the hot monsoon season is when babies hatch, and babies find humid microclimates to hide in during drier times. In extreme conditions they aestivate and don't eat or grow at all when it's hot and dry. Keeping your hatchling in a dry, desert-like enclosure, is a big mistake and an invitation to disaster. It is also very un-natural for these animals. Damp substrate, a water bowl, and a humid hide should all be pre-requisites. Along with this, warm temps day and night are necessary. Sulcatas, leopards and stars are NOT prone to shell rot at all, and they do not get respiratory infections in these damp conditions as long as temps are kept up. I shoot for no lower than 80 degrees day or night year-round, and all three of these heat loving species do well with a day time ambient approaching 90 degrees. Humidity is at 80+% all the time. Most people keep them too cool and too dry. Adults can tolerate colder temps and drier conditions in some circumstances, but this care sheet is for hatchlings and babies and is aimed at helping them thrive, not just survive. I know the books, the breeders and the "experts" all say the opposite of this. They are wrong. They've been wrong for 30 years. For 20 of those years I was wrong right along with them. Some of us have learned and advanced. Some have not. Keep this in mind when consulting a vet, or a potential breeder or seller that you want to buy from. As soon as they contradict this info and tell you "this is a desert species", you will know NOT to buy from them.

Some General Notes:

- Set up your enclosure, run it, check it and adjust BEFORE you bring home a new tortoise. Babies are easy if the set-up is correct. Babies aren't delicate or difficult. When babies are not started correctly is when people have problems with them. Babies have a smaller margin of error due to their smaller body mass, if you've made mistakes, or if the enclosure and equipment isn't already set up and at the right temperatures, you have a high chance to not be successful.
- You won't find most of what you need to set up a tortoise at a pet store. What you will find is expensive stuff that is bad for your tortoise and lots of bad advice. This is true even at most reptile specialty places. Where to get tortoise supplies then? The hardware store or large department stores. There are a few exceptions like reptile thermostats, some reptile heating elements, and UV tubes. I get these from on-line sellers.
- If you are going the grocery store to buy tortoise food, and not bring those foods up to a standard you are feeding the wrong stuff. If you have no other choice but to use grocery store food due to your climate and weather for part of the year, it will need to be amended

to make it more suitable as tortoise food. Grocery greens are not a suitable standalone diet. It's NOT a matter of just throwing salad greens to the tortoise and you're done. More on this later.

- It is my hope that this care sheet finds you BEFORE you buy a tortoise. Most breeders start their babies too dry. The end result is stunting, pyramiding and sometimes death weeks or months later. Don't get a baby from someone who starts them dry, on dry substrate, outdoors all day, and doesn't soak daily.
- Some common mistakes to avoid, with more explanation later: Buying from the wrong (dry) source, getting advice and products from a pet store, free roaming indoors or out, feeding a diet of mostly grocery store foods without amendments, not soaking daily, cool temps, wrong UV bulbs, wrong basking bulbs, letting dogs around your tortoise, small enclosures, open topped enclosures, sand or soil substrates, bad vet care or advice, too much outside time for little babies, keeping a pair of tortoises in the same enclosure...

Heating and Lighting:

I use a 45-65 watt incandescent flood bulb on a 12 hour timer and adjust the height of the fixture to get a basking area of around 95-100 directly under the bulb. In some closed chambers I go with lower wattage bulbs. This depends on many factors and no one can tell you exactly what wattage you will need in your enclosure. Let your thermometer be your guide. I use a ceramic heating element, or a radiant heat panel set to 80 degrees on a reptile thermostat to maintain my ambient temperature in the enclosure. The basking lamp should raise the day time ambient temperature into the high 80s or low 90s. Ambient should be no lower than 80 but drifting up to 90 during the heat of the day is good. The thermostat will keep your CHE or RHP off during these times, but ready to click on after the basking lamp clicks off and the ambient temperature starts to drop at night. I use LED bulbs when I want to brighten up the whole enclosure and I run these on the same timer as the basking bulb. There are other ways to do some of this, but trial and error have shown time and time again, that the above is what works the best. Don't use "spot" bulbs, reptile specialty bulbs, halogen bulbs, any cfl, or mercury vapor bulbs. You want a plain old, regular incandescent flood bulb from the hardware store. I buy them in six or twelve packs, so I always have extras on hand. They always go out at the most inopportune times.

UV:

Tortoises need regular exposure to the right kind of UV rays to make vitamin D2 into D3 to be able to utilize dietary calcium. Real sunshine is best but be careful. Shade should always be available as babies can overheat and die surprisingly quickly. If your tortoise can get some regular sunning time in a safe outdoor enclosure, even just a couple of times a week for most of the year, you don't need any artificial UV. It's okay if you have to skip two or three weeks of sunning time during a cold winter spell. If you live somewhere with long frozen winters, then some artificial UV might be for that time of year. I no longer recommend mercury vapor bulbs for several reasons, but florescent HO (High Output) UV tubes work very well according to my UV meter. CFL type UV bulbs are ineffective as UV sources can sometime burn reptile eyes. No type of compact florescent bulb should be used over a tortoise. Also get yourself a Solarmeter 6.5. Without a UV meter, you are guessing about the UV levels in your enclosure, no different than guessing the temperature without a thermometer. At least without a thermometer you can still feel the temperature with your hand. You can't feel UV levels.

These meters pay for themselves in short order since you won't be replacing perfectly good working bulbs every six months, as the sellers recommend.

Too much outside time is bad for babies. It slows their growth tremendously and causes pyramiding. I've done many side-by-side experiments with clutch mates over the years to determine this. My general rule is an hour of access to sunshine per inch of tortoise. Once they reach around 5 inches, outside all day is fine, weather permitting, but soak daily and continue to let them sleep in their humid closed chamber every night until they get a bit bigger.

The Enclosure:

I have not been able to make any open topped enclosure work to my satisfaction. Low sided open topped enclosures like tortoise tables and sweater boxes are the worst. No amount of covering or attempts to slow heat and humidity loss have worked well for me. There is just no way to keep the warm humid air where you want it. Closed chambers are the way to go. Maintaining whatever temperature and humidity you want is easy and efficient in a closed chamber. They use a lot less electricity because all your heat and humidity is contained with nowhere to go. It also makes maintaining warm night temps a snap. Open tops allow all your warm humid air to escape up and into the room where your enclosure sits. Even if you cover most of the top, the heat lamps create a chimney effect and draw your heat and humidity up and out. Having the heat lamps outside, or on top of, the enclosure also lets most of the electrically generated heat you are creating float up up and away. A closed chamber contains all the heat and humidity. It works best if all the heating and lighting equipment is INSIDE the enclosure with the tortoise. Any other way is a compromise and less than ideal. Maintaining a small open topped box at 80 degrees with 80% humidity in a regular sized room that is 70 degrees and 20% humidity is VERY difficult, if not impossible in a practical sense. A closed chamber makes it easy.

Here are pictures of the plain basic closed chambers that I use to start babies:



You can make it much more fancy and add plants and decorations if you want. I'm going for simplicity and I spend time making their outdoor enclosures more fantastic. When done correctly, your baby will only be in this enclosure for a year or two, and then it will be time to move outside full time with a heated night box or get much larger indoor accommodations if this is what your climate dictates. The small plastic boxes are color coded for each enclosure, they are for daily soakings.

What if you already bought a glass tank or wooden tortoise enclosure? How can you make that one work? You really can't. Covering the top and trying to contain the heat and humidity is better than nothing, but the sooner you resign yourself to buying or building the right kind of enclosure, the sooner you and your tortoise will reap the benefits. Almost everyone gets bad info from the breeder, pet store, vets, and all over the internet. I'm sorry this happens and sorry you bought all the wrong stuff, but it helps no one when a person keeps trying to jam that square peg into a round hole. Think it over, take a deep breath, and just go get the correct stuff now that you know. I encourage people to return the items to the pet shop and tell them why. Eventually they will learn and stop selling dangerous, bad, and useless items to people.

You need to monitor, and periodically adjust your temperatures. You need to regularly check warm side, cool side, basking spot and night temps, and adjust as needed. Every enclosure is different, and they even change with the seasons in most households. It is not enough to screw a bulb in and walk

away. Check those temps, and adjust, preferably BEFORE the baby even comes home. I like to use an infrared temp gun AND digital thermometers for this purpose. Check your temps early and often.

Enclosure Size:

Simply put: The bigger the better. I start babies in a 30x48 inch closed chamber. As a minimum, I would suggest no smaller than 36"x18" for a tiny hatchling, but you'll need to upgrade quickly. They need room to roam around. Once you put in the food and water bowls, the humid hide, and any decorations or potted plants, there is hardly any room left over to walk. Tortoises do not tend to do as well as some other types of reptiles when stuffed into small enclosures. They need room to roam inside their safe heated enclosures, and the floor of your home is not a safe option. Don't think that you'll use a smaller enclosure, and just let Sheldon out to roam the floor for some exercise. This almost always ends in disaster. It's bad for your tortoise and impaction, sickness, injury, or death are the usual result. "But, but, but... I make it safe and supervise closely..." says every person until the day that disaster eventually strikes, and they realize they were wrong. It's a terrible sickening feeling to hold a dead tortoise in your hand. Don't put yourself through this. Make a large enclosure. Don't have room for a large enclosure? Get a different pet that can live in a smaller enclosure that you have room for. Tortoises aren't good pets for everyone. For a sulcata, even 4'x8' is only going to last a year or two. You might get three years with it for a star, leopard or slower growing sulcata, but that is optimistic. Outdoor enclosures can be even larger. Babies will NOT get lost or overwhelmed in 10x10 foot enclosure. In the wild they roam far greater distances than that.

Humid Hide Boxes:

This offers the tortoise a more humid place to retreat to and sleep and can simulate some of the damper micro-climates they might utilize in the wild. It is as simple as getting a \$2 black dishwashing tub from Walmart, flipping it upside down and cutting out a small door hole. I keep the substrate under the tub damper than the surrounding substrate and it works great. You can also use plastic shoe boxes. Sphagnum moss is unnecessary and potentially dangerous since they eat it, and it can cause an impaction. The humid hide is a very important detail that should not be overlooked. Half logs and flower pots on their sides do not work. They are not closed in enough.

Substrate:

There are only three viable options. Coco coir, orchid bark, and cypress mulch. All of these can be purchased in bulk at most hardware or garden center stores at a tremendous savings. I don't like coco coir for these species because it's too messy. I don't like cypress mulch because the pieces aren't uniform, some pieces are too big or too sharp, and because it smells like the swamp that it came from. If these two are all you can find, then go ahead and use them. They are safe and suitable. Fine grade orchid bark works the best. It's cheap, easy, holds moisture well, doesn't stink, easy to clean, easy for babies to walk on, not an ingestion hazard, etc... I recommend against any store-bought soil, "Pets At Home" reptile bedding with the little white limestone bits in it, wood shavings or chips, ground walnut shell, corn cob bedding, rabbit pellets, compressed grass pellet bedding, newspaper pellets, hay, cedar, or any amount of sand. None of those are safe or suitable for an indoor tortoise enclosure.

Water Dishes:

Plain old terra cotta plant saucers work best. They come in a variety of sizes to suit any size tortoise, they offer good traction to little wet tortoise feet, they have low sides, they are cheap, so you can buy extras, and they are shallow so your tortoise won't drown if it happens to flip over and land upside down in the water bowl. Sink the bowl into the substrate for best results. I prefer to give babies two water bowls. Do NOT use the typical ramped pet store bowls. These are great for snakes and lizards, but they can literally be death traps for tortoises. Clean your terra cotta saucer as often as needed. The more they track food and substrate into it, and the more they poop in it, the better. This means they are comfortable using their bowl, and that is great news. Just rinse and refill as many times a day as you need to. A water bowl that stays clean and untouched all day is a water bowl that is not being used for one reason or another. This is a bad sign, and it means your tortoise is one step closer to dehydration.

Soaking:

I recommend ALL hatchlings of ALL species be soaked in 85-95 degree water for at least 20-30 minutes every day. I use a tall sided opaque tub and keep the water depth about a third to half way up the body. If you have a humid enclosure with a humid hide and a water bowl, it is totally fine to skip a day here and there. Soaking only once a week and using a dry enclosure is not enough in my opinion, and I would not buy a hatchling that had been started that way. Once the tortoise gets to about 100 grams, I start skipping a day now and then. I gradually taper it down as they gain size. How often I soak older tortoises depends on a lot of factors, the current weather and season being two big ones. I soak more often when it's hot and dry. If you live in a warm, humid, rainy climate, and your tortoise is exposed to these conditions, soaking less often is probably fine, but it still won't hurt anything to do it. You cannot soak too much or for too long. Soaking does not do any harm whatsoever. It doesn't make them poop too much and not digest their food, it doesn't upset their "water balance", whatever that is, it doesn't give them shell rot or respiratory infections, and it is NOT unnatural in any way. "But, but, but... Who soaks them every day in nature???" These babies hatch at the start of the RAINY season in the wild. Its raining on them frequently, and puddles form all over the place. Keep the soak water warm for the entire soak. If you are in a hurry, 10 minutes is enough. If you are forgetful or get distracted, an hour will do no harm.

Feeding:

So much contradictory info on this subject. It's simple. What do they eat in the wild. Grass, weeds, leaves, flowers, and succulents. Feed them a huge variety of these things, and you'll have a healthy tortoise. All these species are very adaptable when it comes to diet and there is a very large margin of error, and many ways to do it right. What if you don't have this sort of "natural" tortoise food available for part of each year because you are in the snow? You will have no choice but to buy grocery store food. What's wrong with grocery store food? It tends to lack fiber, some items are low in calcium or have a poor calcium to phosphorous ratio, and some items have deleterious compounds in them. All of these shortcomings can be improved with some simple supplementation and amendments. A pinch of calcium two times per week will help fix that problem. You can also leave cuttle bone in the enclosure, so your tortoise can self-regulate its own calcium intake. What about fiber? Soaked horse hay pellets, soaked ZooMed Grassland pellets, Mazuri tortoise chow,

"Salad style", "Herbal Hay" both from [@TylerStewart](#) and his lovely wife Sarah at Tortoisepsupply.com, or many of the dried plants and leaves available from Will [@Kapidolo Farms](#). If you must use grocery store foods, favor endive and escarole as your main staples. Add in arugula, cilantro, kale, collard, mustard and turnip greens, squash leaves, spring mix, romaine, green or red leaf lettuce, butter lettuce, water cress, carrot tops, celery tops, Bok choy, and whatever other greens you can find. If you mix in some of the amendments mentioned, these grocery store foods will offer plants of variety and fiber and be able to meet your tortoises' nutritional needs just fine. I find it preferable to grab a few grapevine or mulberry leaves, or a handful of mallow and clover, or some broadleaf plantain leaves and some grass, but with the right additions, grocery store stuff is fine too. Grow your own stuff, or find it around you when possible. Tyler and Sarah also sell a fantastic Testudo seed mix that is great for ALL tortoise species and also super easy to grow in pots, trays, raised garden beds, or in outdoor tortoise enclosures. When that isn't possible, add a wide variety of good stuff to your grocery store greens to make them better.

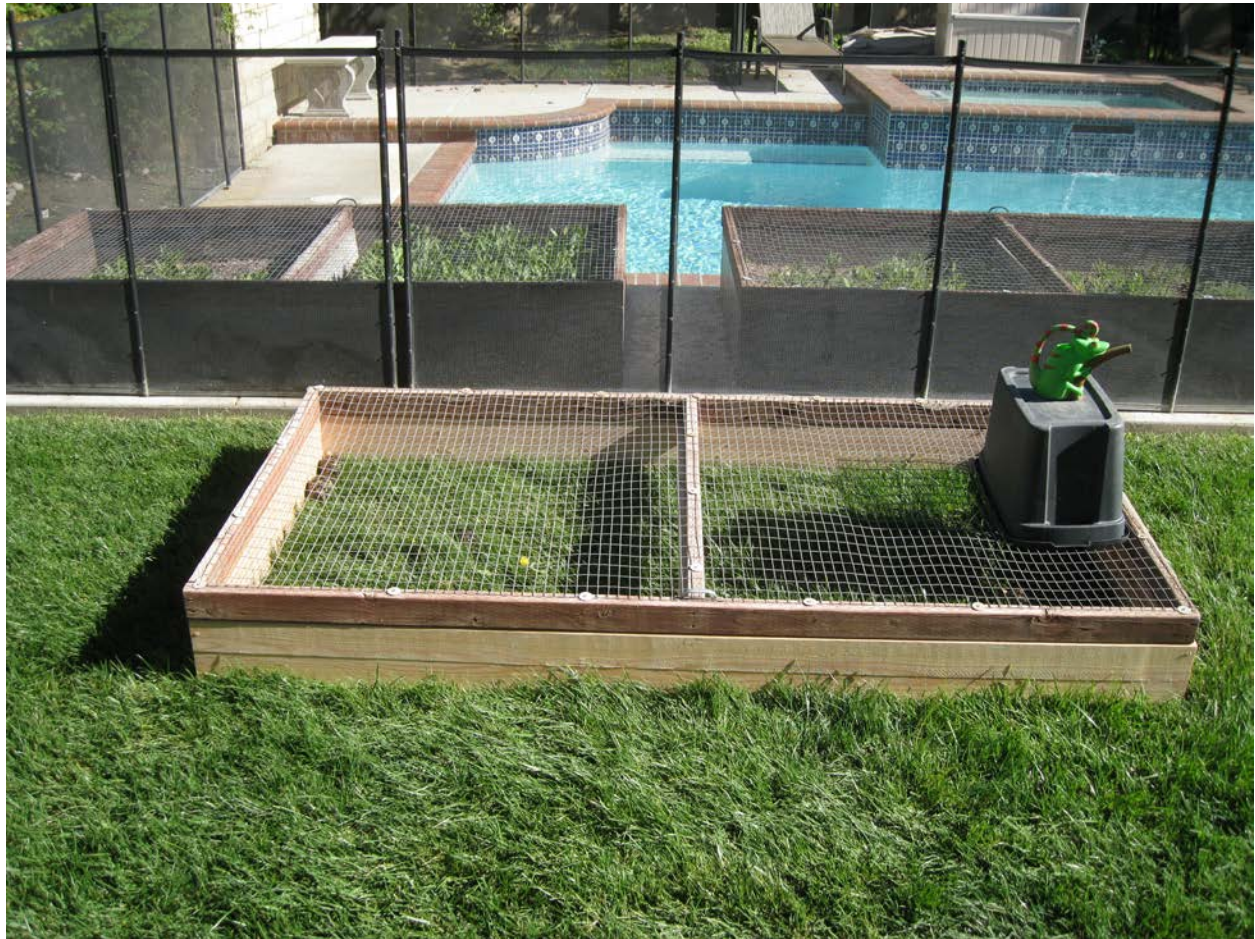
Supplements:

I recommend you keep cuttle bone available all the time. Some never use it and some munch on it regularly. Some of mine will go months without touching it, and then suddenly eat the whole thing in a day or two. Sulcatus and leopards grow a lot. This requires a tremendous amount of calcium assimilation over time. A great diet is paramount, but it is still a good idea to give them some extra calcium regularly. I use a tiny pinch of RepCal or ZooMed plain old calcium carbonate twice a week. Much discussion has been given to whether they need D3 in their calcium supplement. Personally, I don't think it matters. Every tortoise should be getting adequate UV exposure one way or another, so they should be able to make their own D3. I also like to use a mineral supplement. "MinerAll" is my current brand of choice. It seems to help those tortoises that like to swallow pebbles and rocks. It is speculated that some tortoise eat rocks or substrate due to a mineral deficiency or imbalance. Whatever the reason, "MinerAll" seems to stop it or prevent it. Finally, I like to use a reptile vitamin supplement once a week, to round out any hidden deficiencies that may be in my diet over the course of a year.

Outdoor Enclosures:

This is a MUST in my opinion. Tortoises are solar powered, need lots of walking room, and benefit greatly from some time in the great outdoors. With hatchlings I start with short excursions of only an hour a day, followed by a soak on the way in. As they gain size, I like to leave them out longer and longer each day, weather permitting, until they eventually live outside full time with a heated night box of some sort, where climate allows. Outside time must be done with great care as there are many dangers. They can overheat, be eaten or mauled, or escape. Here is one simple idea. A large wading pool or horse watering trough could also work. If you don't have a suitable grassy area, you can put a plywood bottom on this with wheels and legs and move it around. Do NOT let your baby roam free outside. You will lose it eventually, and you'll be unable to explain how it happened so fast when you were watching so carefully. It's a sickening feeling. Don't put yourself through this. Use an enclosure and make it large. Also, if you have a dog, or people who come to visit bring a dog, your tortoise is in grave danger. Be careful. EVERY dog will chew up a tortoise. It doesn't matter how nice and loving a dog it is. Tortoises are seen as chew toys by dogs. Don't let this happen to your tortoise.

Physically prevent it with fencing and/or correct housing. Don't leave it to chance. It is a horrible sickening feeling holding a mauled tortoise in your hands. Don't put yourself through this.



Pyramiding:

This is the subject of many discussions. I will simply state here what I know to be true based on my experience, my experiments, conversations with people who live in other countries and study tortoises, people who have kept them for decades here in the U.S., and personal observations of thousands of tortoises in all manners of keeping styles.

There are many things listed as causes of pyramiding. I can refute each one with multiple examples. Lack of UV, lack of calcium, too much protein, too much food, the wrong foods, fast growth, wrong temperatures, small enclosures, not enough exercise, indoor housing, etc. None of these factors CAUSES pyramiding. They can all be somehow related to it, but they don't cause it. Simply put: Pyramiding is *caused* by growth in conditions that are too dry. This is true for any species of tortoise, even the ones that don't typically pyramid. To prevent pyramiding, I use a closed chamber and keep the ambient temperature 80 or higher all the time, I keep humidity at 80% or higher, I offer a humid hide that holds 95-100% humidity, I soak daily to ensure good hydration, and I spray the carapace with plain water several times a day. Sulcatas hatch during the African rainy season. It is hot, humid, rainy and marshy. It makes no sense to keep them in a dry box, with dry substrate, and a hot

desiccating bulb overhead. Simulating this rainy season has grown me hundreds of smooth leopard and sulcata babies, as well as a few other species too. There are literally thousands of examples of other people succeeding using the same basic philosophy as explained here. So please, don't keep sulcatas and leopards in desert-style enclosures. It is not healthy for them. They are not the least bit prone to shell rot, like some other species are, and they DO NOT get respiratory infections from high humidity if temps are 80 or higher everywhere in the enclosure, day and night. I don't say these things and come up with these assertions lightly. It's not that I raised one tortoise this way, and everything went okay. I have literally raised hundreds of tortoises of multiple species this way and had nothing but success. My methods and success rate have been repeated by thousands of tortoise keepers all over the globe. We have more than 10 years of living healthy examples to back up these assertions.

If you want to prevent pyramiding, simply do the above stuff.





