



SULCATA STATION

About Hatchling Failure Syndrome (Chronic Dehydration)

Sulcata Station often receives frantic phone calls and emails from owners of hatchling and juvenile sulcata tortoises, saying that their tortoise is ill, and describing the same symptoms, as follows:

- Tortoise stops eating
- Tortoise becomes lethargic and stops coming out to bask
- Tortoise's eyes close and won't or can't open, and tort begins to show signs of respiratory infection
- Tortoise may spend hours (or even overnight) sitting in its water bowl
- Tort's shell becomes softer, and limbs become limp and unresponsive

In trying to answer these frantic emails, I went through my computer's hard drive looking at old posts I've saved from various tortoise forums in which I participate. I came across an intriguing post that Brad Morris sent to the Tortoise Trust list in 2001. In his post, Brad described what he called "Hatchling Failure Syndrome," the symptoms of which match those in the list above.

Brad's post that describes this behavior is included below, with his permission:

Date: Mon, 20 Aug 2001
From: BF Morris

---Andy Highfield wrote:

As a matter of interest, most reported cases of hypercalcemia are in all probability not directly related to diet or oral intake, but are noted in association with other metabolic disorders. Such cases are often misdiagnosed.

I think so too, as was this similar example, a dilemma which a local veterinarian sought my help with recently. Initially the "hatchling failure syndrome" was blamed on the exact opposite, hypocalcemia: hatchlings' health deterioration and ultimate death; during which steadily softening shells, weakening plastrons etc. were noted.

Ultimately, the cause was traced to organ damage that was caused by a bout with dehydration that occurred months earlier. The keeper had a steady source of water available, which misled the vet. Humidity levels plunge at times throughout the year; it can become so dry that hatchlings can start getting into trouble overnight if not provided with at least a semblance of a micro-habitat to protect them from drying out. Once they get a little dehydrated, some of them will not budge the next day and this of course exacerbates the condition.

Dehydration may be etiological in misdiagnosed cases of hypercalcemia also, for example when a bladder calculi is analyzed and found to contain a percentage of calcium. "Well", the owner says, "I soaked him regularly", so naturally the vet does not suspect dehydration. So the torti are being regularly soaked, but: does that unequivocally mean that all of them drinking regularly, and was the torti's environment at home thoroughly reviewed?

Brad

A Basic Description of Hatchling Failure Syndrome

To put Brad's email into simpler language: **Baby tortoises can literally become dehydrated overnight if kept in dry conditions without access to a scrape or burrow that allows them to maintain proper hydration status.** Over time, if they do not get sufficient water back into their systems, they experience chronic dehydration, which can cause their kidneys to fail. One of the main jobs of the kidneys is to filter the blood and remove the toxins and acidic byproducts of normal cellular metabolism. As the kidneys fail, they are less effective at filtering the bloodstream.

As the tortoise enters "end-stage renal failure," the kidneys completely shut down, causing toxins and acidic compounds to build up in the bloodstream. To neutralize the rising acid levels in the blood, the tortoise's body begins to remove calcium from its bones and shell -- leading to the softening of the shell, limp limbs, and the other symptoms described above. Once this process starts, it is extremely difficult to counteract. The kindest thing at that point may be to put the tortoise to sleep, sadly enough.

Preventing Hatchling Failure Syndrome

The only real way to treat Hatchling Failure Syndrome is to keep your tortoise from becoming dehydrated in the first place. What should you do to keep your baby/hatchling tortoise from getting dehydrated?

- Continue to soak your baby tortoise regularly and provide a shallow water bowl for it to drink from.
- Provide a substrate that holds moisture, such as a 50/50 mixture of Bed-A-Beast® and topsoil, and make sure that the substrate is deep enough to allow your tortoise to dig a nightly burrow or scrape (a shallow burrow excavated on top of the soil). A tortoise will usually choose a dark corner away from any light or heat lamps for this purpose, so you can pile the substrate in that area.
- Or, you can provide an appropriately-sized hide box with a cellulose sponge attached to the inside, and keep the sponge damp.
- Monitor the humidity on your tortoise table. You'll need to purchase a hygrometer and find a way to place it in the enclosure near where your tortoise sleeps. Try to maintain a humidity level of 60 to 75 percent in whatever area your tortoise sleeps in.
- Buy a spray bottle, a pump sprayer, or a watering can and use it to moisten the substrate as needed to maintain a high humidity level in that sleeping area.

We began regularly watering our tortoise table's substrate in response to the extremely low indoor humidity (sometimes less than 10 percent!) that we typically get in the wintertime. We noticed that once we began doing this, our tortoises had far better appetites the next morning, and woke up ready to go.

Humidity and sulcata tortoises

Many people have been told by misinformed pet stores or vets that because sulcata are desert animals, they cannot tolerate any humidity. **This is wrong.**

In fact, hatchling sulcata tortoises in the wild make extensive use of underground burrows in which the ambient humidity is significantly higher than above-ground humidity. They do this for at least two reasons:

- Higher humidity levels found inside burrows help smaller tortoises to stay properly hydrated; and
- Smaller tortoises are much safer from predators if they remain in or near their underground burrows as much as possible.

The single best explanation of this issue has been provided by Darrell Senneke, Director of the World Chelonian Trust, on yet another tortoise email list:

From: Darrell Senneke
Date: Mon Sep 9, 2002
Subject: Re: Thoughts on Hatchling Failure Syndrome

I was under the assumption that humid conditions were bad for my African torts. Is 40-60 percent the level I should try to reach in their home? It is normally around 35 percent. I have a leopard and a sulcata. Thanks for a response in advance.

The answer to that is yes -- and no. (Don't you just love clear-cut answers!)

What is problematic is that we cannot duplicate a natural environment indoors for any tortoise. While the recorded humidity for areas that *G. pardalis* and *G. sulcata* live in the wild may be very low, the humidity that is found in a scrape under a bush for a *pardalis* or in a burrow for a *sulcata* can be considerably higher.

While this is generally not a problem for tortoises with access to water, hatchlings -- particularly indoors in the summer in an air-conditioned building -- do not retain body moisture as well as adults. In air-conditioned houses, the ambient humidity can drop to 10% or lower.

A two-inch tortoise has roughly 8 times the surface-to-volume ratio of a four-inch tortoise. That means they only have one-eighth the reserves (moisture) of the larger animal. In addition the shell and skin is thinner so the transpiration through the skin is faster.

In the wild, if a hatchling is to survive (and very few do), it must have access to an area that will allow it to retain its moisture. In captivity (indoors) there is no way it can look for this area -- we must supply it.

What some people do is what Steph suggests - light misting of the environment. I would suggest doing this but I would also try to create a gradient so the tortoise has a choice between areas of higher humidity and lower just as we supply areas of higher temperature and lower. As you said, high humidity is also not something we want -- particularly stagnant highly humid air.

A dampened sponge attached to the inside top of the hide box may work well for this purpose. Another option is to soak babies every day. I know that Victor Loehr lightly mists the food for his Padlopers as a way of supplying extra moisture.

Basically we have to try to duplicate something that we cannot duplicate - so we do our best to make up for it in other ways.

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Sulcata Station's response to Darrell's post was this:

From: steph moore

Date: Wed Sep 11, 2002

Subject: Re: Thoughts on Hatchling Failure Syndrome

---Darrell Senneke wrote:

While this is generally not a problem for tortoises with access to water, hatchlings – particularly those kept indoors in the summer in an air-conditioned building – do not retain body moisture as well as adults. In air-conditioned houses, the humidity can drop to 10% or lower.

This is true if you have refrigerated air as your home's cooling system. If you use an evaporative cooler (aka a swamp cooler), then you are putting humidity into your home, and low indoor humidity will not be as likely to occur during the summertime.

Here in New Mexico, problems with low indoor humidity occur during the wintertime. Last winter was extremely dry with very little rainfall or snowfall. Our home's central heat is provided by a natural gas furnace, which creates a very dry heat. Thus, with these two factors operating simultaneously, it's not uncommon for us to have 10% or less ambient humidity indoors during the winter.

This is why we started actually watering the topsoil substrate on our tortoise table. We use a 2.5 gallon galvanized steel watering can, and we pour anywhere from 2.5 to 5 gallons of water all over the substrate at least twice a week during the wintertime. After being watered, the humidity at table-level rises to 40 to 50 percent within about a half-hour, and it will slowly decrease over time.

Folks who live in more humid areas probably wouldn't need to do this, nor should they. It's just incredibly dry here due to extended drought, and we find that we need to provide the additional moisture.

What some people do is what Steph suggests - light misting of the environment. I would suggest doing this, but I would also try to create a gradient so the tortoise has a choice between areas of higher humidity and lower, just as we supply areas of higher temperature and lower. As you said, high humidity is also not something that we want - particularly stagnant highly humid air.

We originally tried just misting the substrate with a spray bottle, but found that it just didn't raise the humidity enough. Spray bottles got the very topmost layer of substrate wet, but the stuff underneath remained dry. Once our tortoises dug through the top layer, they pretty much got rid of all the moisture available. This is why we switched to the watering can. We also use a small gardening fork to mix the substrate as we water, so that all of it the substrate is wetted.

The substrate directly underneath their heat lamps (on a 12 hour timer) dries out relatively quickly. The corners where the torts sleep remain more humid, so they can choose for themselves where to go.

Basically we have to try to duplicate something that we cannot duplicate - so we do our best to make up for it in other ways.

As Darryl pointed out in a subsequent post, we are trying to duplicate the conditions found in a sulcata burrow, where the ambient humidity has been measured at between 40 to 60 percent. This prevents our torts from getting dehydrated and running into health problems as a result.

But again, this is what works for us, in our semi-arid to arid location. Someone in Houston or Memphis or Tampa, etc. might not need to add all this supplemental humidity.

steph moore

Sulcata Station has a related page on this issue: [What Causes Pyramiding In Tortoises?](#)

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