Chameleon care

Preventing and treating respiratory infections

by Petr Necas and Bill Strand

It is, arguably, an infection that is responsible for the most deaths in captive Chameleons. Young or old wild caught or captive bred, it is the disease with a mysterious acronym – RI. It is the respiratory infection. It is a strange and banal disease, and it is deadly.

For the sake of our Chameleons, we must understand this disease and answer the crucial questions that will allow us to finally eliminate this plague from our terrariums. To do this we will explore what a respiratory infection is, how it takes hold, what the symptoms are, and how we can treat it.

What is a Respiratory Infection?

A respiratory infection (RI) is a condition where air borne pathogenic bacteria has been allowed to reproduce unchecked in the respiratory tract and cause inflammation. Bacteria are microscopic living organisms that, like all living organisms, give off waste products as a result of their metabolism. In some cases, this waste product is toxic to other living creatures and causes various diseases, depending on the type of bacteria.

Bacteria is all around us. Therefore, we, Chameleons, and every living being have had to develop immune systems that would kill bacteria and keep them from finding a suitable place in our body to settle and multiply. Because once they start multiplying they don't stop and, although our bodies can easily process the toxic secretions of a small number of microscopic organisms, the toxins from a large population will overwhelm our systems and lead to severe tissue and organ damage and eventually death.

The respiratory tract is a common place of entry because it is moist and its primary function, breathing, results in a refreshing of bacterial exposure with each breath. We define a respiratory infection as 'lower' or 'upper' depending on its location.

- **LRI – Lower Respiratory Infection.** This is an infection, or pneumonia, located in the lungs and pulmonary sacks of Chameleons.
- **URI – Upper Respiratory Infection.** This is an infection found in the upper respiratory tract, nasal cavity and paranasal sinuses.

Both upper and lower respiratory infections may be present at the same time, at different or similar stages, and one can develop from the other – as they often do. If left untreated, respiratory infections can expand into mouth rot, eye infections, and temporal gland infections. Because the respiratory infection further weakens the body and taxes the immune system, RIs can allow other diseases and parasite infections to become worse. Likewise, the RI can become worse due to weakness of the animal caused by other infections, parasite infestation or mistakes in husbandry.

Symptoms of respiratory infection

Respiratory infections are deadly if left untreated. Therefore, every Chameleon keeper must be on guard for the following symptoms and act quickly to consult with their veterinarian for treatment.

Lower respiratory infection:

- Heavy breathing
- Unnatural inflating of the body and throat
- Exposing ribs
- Sleeping head down or head up
- Strange sounds while breathing
- Gaping
- Fluid in lungs and pulmonary sacks
- Bubbles in the throat or foam
- Tetanic contractions of the body
- Sitting with head up on stretched front legs

Upper respiratory infection symptoms:

- Transparent or milky discharge from the nostrils
- Swelling between the canthi rostrales above the nostrils (on the upper surface of the head between the rostrum and eyes)
- Periocular swellings (swellings around the eyes or at the base of the turrets, especially towards the nostrils)

How does a respiratory infection happen?

A respiratory infection can come from any of the many types of bacteria that are in the environment all year round. Your Chameleon's immune system is constantly fighting these off and, as long as the immune system is healthy, a balance is kept. However, once the immune system is weakened the bacteria can take hold. Why do we see so many respiratory infections in captive Chameleons? Simply – inadequate care and improper husbandry. Thankfully, with education and some effort, we can fix the situation and provide an environment for our Chameleons which will keep their immune system in top shape.

There are five main root causes of respiratory infections

1 Improper hydration

In the wild, most Chameleons are exposed to high humidity in the air. This can be up to 100% humidity during the night, while the daytime humidity drops significantly. A big mistake in captivity is providing low humidity at night and giving both humidity and hydration during the daytime only. By doing this, we desiccate our Chameleons at the times when their bodies are designed to hydrate themselves and force them to catch up during the day. This destroys their inner balance and stresses their system. Surprisingly, Chameleons drink very rarely in the wild *(P. Necas, Carl Cattau, Jan Stipala pers. obs.)*. This is because the basic hydration happens through inhaling the moist air during the cold night. In captivity, many Chameleons behave like heavy drinkers because they are trying to compensate for the dehydration during the night. We then react by misting and fogging during the daytime when the temperatures are high. This creates unnatural pressure on the Chameleon physiology and we unwittingly create a humid and warm environment which is ideal for bacteria to thrive. Stressing the Chameleon's systems and strengthening the bacterial attackers gives predictable and life-threatening results.

2 Absence of natural dietary antibiotics

Chameleons actually self-medicate in the wild. By eating pollinating insects they ingest large amounts of pollen every day. Pollen contains powerful natural antibiotics, building an antibiotic shield which kills both bacteria and fungi just after they enter the animal and before they can take hold. If pollen is not part of the captive diet, this function is absent and the Chameleons are exposed to pathogens without their natural antibiotic shield.

3 Artificial surfaces providing bacterial breeding grounds

Chameleons in the wild dwell on living plants and natural branches. The environment and its elements have bactericide and fungicide function to control the presence of these organisms in the wild. Plus, as living elements of the environment, plants possess a self-cleaning function. Dead branches still retain some of this function.

In captivity, we use plastics for a number of functions including misting nozzles, plastic vines, and on the walls and floors of cages. While plastic items may be cleaned, none of them have the self-cleaning aspect that a live plant and natural wood can offer. Fake vines, dead-moss-covered fake vines, and diverse ropes made of natural or artificial fibre can get soaked with moisture. They can then get polluted by biological dust, remnants of faeces, urine, dead skin, and remnants of feeder insects and their excrement. If these surfaces are not kept clean and you couple that with a warm, humid environment, they can provide a perfect area for the growth of bacteria and fungi.

The same hot, humid and dirty environmental husbandry that allows infection to grow on these surfaces also weakens the Chameleon's immune system. In this way, we actually unwittingly create hotspots for bacteria and fungi to reproduce and to spread themselves and their spores. Their concentration in the semi-isolated space of the cage rises to unnaturally high levels and they are poised to infest the Chameleon at any suitable opportunity.

Live plants

Installing live plants in Chameleon enclosures has enormous benefits for health, husbandry and welfare. See our live plant promotion on page 10.

4 Insufficient UV

Chameleons in the wild are exposed to UV all day long, regardless of whether they bask or sit in the bush under leaf cover. There is a range of wavelengths, 265 – 300nm, that have been shown to have powerful antibacterial properties. Chameleon enthusiasts will recognise this range as very close to, and widely overlapping with, the magical 280 – 320nm range which provides the precious vitamin D3 metabolism. While the most effective antibiotic wavelength – 265nm, sits in the dangerous-to-life UVC range, there are still antibiotic properties in the wavelengths at the lower end of the UVB spectrum where UVB lights used in captivity operate. Once again, we are playing catch up with what they get in the wild, but inadequate UVB exposure removes more than just the opportunity to synthesize D3. It also chips away at their defensive immunity shield.

5 Inadequate air exchange

In the wild, Chameleons live in the open air and wind. General air movement blows many germs away. And, while it will blow new ones into the area, there is a constant movement and this dynamic does not allow them to concentrate in one place. Terrariums, on the other hand, restrict air movement to varying amounts. If they are not equipped with mesh ventilation areas, they can allow air to get trapped and this will build an environment where germs can take hold. And the more dangerous the biomass present, the greater the possibility it will win the fight against your Chameleon's immune system.

Treating the infection

Treatment of respiratory infections is problematic and requires the assistance of a qualified veterinarian. Bacterial reproduction is usually controlled by the Chameleon's immune system. It becomes out of control and of a clinical nature when it starts impeding the Chameleon's normal functions, such as breathing. Any of the symptoms listed on page 6 are an indication that the Chameleon needs help fighting the infection.

The proper approach is as follows:

- A qualified veterinarian inspects the animal holistically as soon as possible. This should include its body, breathing and, most importantly, the inner space of its mouth.
- The vet takes samples from the throat and cultivates it to identify the exact pathogen and the antibiotic which will be most effective against it. This step is the way to ensure that the medication will be effective. Unfortunately, this step is rarely performed as the Chameleon owner is often unwilling to pay the money the test costs.
- An antibiotic is selected and treatment is prescribed. If the sensitivity test is not performed you will be prescribed a broad spectrum antibiotic that will likely work to some degree, but the danger here is that it may work, or it may not. Every medicine takes a toll on your Chameleon's body. Side effects can be fatal, depending on the drug, so it makes sense to medicate only when necessary and to give exactly what is required. A sensitivity test is always recommended.
- An antibiotic course, usually minimum 7 – 10 days, is executed. The first positive results during the treatment should be apparent after the third day. Due to their physiology, Chameleons need more time than mammals. The entire process should be supervised by an experienced veterinarian. Focused hydration is necessary during the treatment, as dehydration is one of the common side-effects of some antibiotics.

IMPORTANT
Even if the Chameleon seems to be better, the whole course of the antibiotic treatment should be completed.

- Avoid unqualified and dubious recommendations, such as giving Chameleons a warm bath or exposing them to steam. Both of these have been recommended and both are inappropriate. This practice is good for homeothermic animals, such as mammals and birds, but this is not appropriate for Chameleons. It is not logical to expose the animal to the warm and humid conditions that are the very cause for the outbreak of the disease itself. The logic that we need to get warm moisture breathed into the lung to facilitate the animal purging the fluids by having them come up into the throat and out of the lungs is questionable. Chameleons do not cough! The only correct way to approach this is to increase the humidity at night using cold fog from a sonic fogger.

This juvenile T. melleri is hours away from death with an advanced respiratory infection that did not respond to antibiotic treatment. Whether the antibiotic was the wrong type for the bacteria or the treatment just too late is unknown.

Tariq Abou Zahr – exotics veterinarian

Respiratory infections are less common in Chameleons than in other species in my experience. However, when they do occur, they should be taken very seriously as progression can lead to pneumonia – which is serious in any species.
Chameleons are less robust than many other reptile patients and are prone to going downhill quickly. They do not cope well with stress and this needs to be borne in mind when considering frequent interventions. There are a number of causes of respiratory infections, including primary infectious agents and parasites, but a very large number are caused as a result of immunosuppression, particularly where animals become stressed due to husbandry deficits. This allows micro-organisms which are routinely in the environment but normally do not cause disease, to be opportunistic and cause infections. Any Chameleon with respiratory disease should be presented to an exotic vet at the earliest opportunity. Ideally a culture and sensitivity test should be performed and an appropriate treatment begun.

Correcting husbandry

It is essential to provide an environment that Chameleons require for thriving and not to compromise on something that causes the outbreak of the disease.

Be sure to:

- Ensure humidity is high at night and low during the day.
- Ensure the temperature is low at night and without heat emitters, and not too high during the day. The opportunity to bask must always be available if required.
- Ensure misting only happens when the heat lights are off and temperatures are cool. Ambient light is acceptable if it simulates the lighting of an afternoon rain shower. Turn off basking lamps an hour before the misting system goes on and do not bring them back up until an hour after.
- Ensure bee pollen is added to the diet with every meal.
- Ensure sufficient UVB is provided. This can be either naturally through exposure to the sun's rays unfiltered by glass, or through using unexpired artificial UVB sources with adequate output.
- Use living plants and natural branches in the cage to simulate the natural environment closely. Though there always has to be compromise, the closer you can get to the natural environment the better.
- Provide adequate ventilation. For most species, consider using either screen terrariums or glass cages with big screen ventilation openings, or forceful air movement such as through chimney effect, fans or ventilators.

Conclusion

A respiratory infection is a disease caused by improper husbandry practices and inadequate care. There is no recorded instance of a respiratory infection in the wild. We would be naïve to believe that Chameleons never get infections in the wild, but the lack of examples suggest that their antibiotic diet and UV shield is highly effective against it.

If we encounter a respiratory infection in our collection we must consider it a warning sign that one or more husbandry parameters are wrong and must be corrected immediately. Let us eradicate respiratory infections from Chameleon captivity and see only healthy and thriving animals.