

Minors's Chameleon (*Furcifer minor*)

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Introduction and Description

Minor's chameleons are one of the smaller, most beautifully colored, and rarest of all chameleons. Once imported with frequency when Madagascar limited its exportation of chameleons to a few species this beautiful gem disappeared from captive collections in the USA. Luckily, several breeders in Europe were successful in breeding them and an import of captive bred individuals of diverse lineage occurred several years ago, once again making them available to a few hobbyists. They are classified as an endangered species and they will likely never be imported from the wild again. While they are still incredibly rare in captive collections I have had relatively good success in breeding them and hope to be able to offer them to other hobbyists late in 2018 and into 2019.

The obvious appeal of Minor's chameleons is their intense and spectacular coloration. Unlike most other species of chameleon, it is the females that possess the most beautiful coloring. A female at rest is usually a pleasant shade of emerald green with bright red on the head and red and blue dots on the sides, accompanied with some yellow banding. When the female is gravid or unreceptive she shows her most spectacular colors. Males are typically a beige or gold coloration with some darker banding. When a male is displaying to a female or another male he can become incredibly vivid and will also show black, orange, and yellow coloration. Males of this species are also easily distinguished from females as they possess two fairly large horns on the front of their head. Females have only very small nubs on the face. Minor's chameleons are also a small species with females typically around six inches in total length and males up to nine inches. About half of the length is tail. Their small stature makes them excellent candidates for hobbyists that are limited in space and cannot provide the large enclosures that the more common Panther or Veiled chameleons require.

While they are known as a delicate species I have found that they are rather hardy and prolific as long as their needs are met. Starting with healthy captive bred individuals is also an important first step to success. If you have had success keeping and breeding more commonly kept species for several years than the Minor's chameleon would make an exciting and rewarding next project. At this time Minor's are still incredibly rare in captivity and I think that anyone that wants to pursue working with them should have captive breeding as a goal.

Enclosures

The following information can be applied to the keeping of all commonly kept chameleon species, not just the rare Minor's chameleon. Chameleons can be kept in a few different ways. I have successfully kept this species in glass terrariums such as those made by Zoo Med or Exo Terra and in all screen enclosures (ex. Zoo Med Reptibreeze) that are typically recommended for chameleons. My current preferred method of keeping Minor's (and all other species of chameleons) are in enclosures with solid sides and a screen front and top. You can create one of these yourself by cutting and affixing plastic cardboard (chloroplast) panels to the back and sides of a readily available screen enclosure or you can purchase one pre-made from Dragon Strand (www.dragonstrand.com). Minor's can thrive in both types but your keeping strategies will vary somewhat depending on which type you choose.

Unfortunately, many people still dogmatically adhere to the false notion that chameleons cannot be kept in glass terrariums. This is something that I continue to try to combat as keeping chameleons in glass terrariums that have some front ventilation (Zoo Med and Exo Terra terrariums do) is a great option for smaller species. Glass terrariums are great at holding heat and humidity so that means less frequent misting sessions and smaller wattage heat lights. Glass terrariums can also be beautifully planted with a natural soil and tropical live plants. There are some considerations when using glass terrariums though. First, fully planted glass terrariums are heavy! Something to consider if you plan on moving in the near future. Second, chameleons need to drink droplets of water off leaves and other cage furniture so misting is a necessity. If you use an automatic misting system (which I recommend) you have to be very careful to not

overwater the enclosure. Too much water being added can quickly accumulate and create a stagnant mixture of water and soil at the bottom.

Screen enclosures on the other hand are very light and easy to move but do not hold heat or humidity very well at all. Longer misting sessions and higher wattage basking bulbs are required. Screen enclosures come with a solid bottom but they are not designed to hold water so a method must be devised to collect the excess water that will be running out of the cage from misting sessions. The best way to do this in my experience is to use a custom made PVC drainage tray. These are basically small pans that are slightly larger in area than the enclosure with some struts for the enclosure to sit on top of. Water will run out of the cage and into the pan where it can be removed via a bulkhead or a wet dry shop-vac. These pans can be purchased from D.W. Geckos and Geckos & Terraria (www.dwgeckos.com) and Dragon Strand. I am not a fan of using all-screen enclosures for chameleons indoors. Too much heat, water, and humidity escapes to create an ideal environment. This can be easily fixed though by covering the back and sides of the enclosure with PVC or chloroplast sheeting that are cut to size. The front and the top of the enclosure are left as screen. This keeps a lot of the heat, light, and water in the cage where it belongs while still allowing for good air flow and a light weight enclosure. These enclosures can also be easily moved outdoors when the weather permits.

The interior of the enclosure should be designed with the chameleon's arboreal nature in mind. I like to use a large live plant that takes up about half of the volume of the enclosure. My favorites are Schefflera arboricola and Ficus benjamina. Both species are easily found, hardy, and provide good climbing opportunities and cover for the chameleon. Many branches of various diameters should be placed through all the levels of the enclosure. The branches should be placed in such a way that you have horizontal, diagonal, and vertical branches at all heights in the enclosure. This makes complete use of the enclosure volume as well as allowing the chameleon to thermoregulate itself by moving throughout the enclosure.

Being one of the smaller species of true chameleon, Minor's do not require an overly large enclosure. I keep most of my adults in 18"x18"x24" terrariums. I have occasionally had an animal that was more prone to roaming and was stressed in this size of enclosure and did better in something a bit bigger. You can go as big as you want but I would not keep an adult in anything smaller than 18"x18"x24".

Heating and Lighting

Minor's are heliophilic (sun-loving) lizards that enjoy bright light and a warm basking spot. All of my chameleon enclosures have a dual-fixture fluorescent light strip. One of these bulbs should be a 6500K spectrum bulb that will provide nice bright white light that is excellent for plant growth. The other bulb should be a UV producing fluorescent light. I use and recommend Reptisun 10.0 and Arcadia 6.0 bulbs. It would be difficult to over-light an indoor enclosure so you could add more light with LED strips (also 6500K).

A localized hot spot should be provided using a separate basking bulb. I like to use halogen flood lights as they provide strong, warm, and localized light. I will not recommend a specific wattage of light as that will vary depending on the size of the enclosure, the distance from the branches, room temperature, and whether the enclosure is made of glass or screen. While temperatures should vary seasonally (more on this in the breeding section) I try to provide a basking spot of 90-100 F and ambient day time temperatures in the 70's F. A night-time temperature drop should be provided and can be created by simply turning off all of the lights at night. No extra heat should be provided at night at normal room temperatures.

Weather of the natural habitat of *Furcifer minor*:

	<u>Jan</u>	<u>Feb</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>
Average Temp.	70	72	68	66	63	59	57	59	61	66	68	68
Minimum Temp.	62	62	61	59	54	50	50	50	52	55	59	61
Maximum Temp.	79	81	79	77	73	68	70	68	75	79	81	79
Number of Rainy Days	26	23	25	19	17	18	21	21	16	17	20	24

Hydration

Hydration is one of the most important aspects of chameleon husbandry and it is currently going through a bit of a renaissance in the hobby. The biggest problem with humidity and chameleon keeping is that the majority of the species being kept, including *Furcifer minor*, are from high humidity regions and replicating that high humidity indoors can be challenging. For years, successful chameleon keepers have gotten around this by heavily misting their animals several times a day. This would provide a temporary spike in humidity and allow the animals to drink from the accumulated water droplets on the leaves of plants. Most keepers, myself included would only mist their animals during the day while they were awake and could drink, allowing the enclosure to dry out during the night. While this strategy certainly does work it does go against natural humidity patterns and may not be ideal. In many tropical environments atmospheric humidity spikes at night and dries out during the day. This happens even in the “dry season” where rain may not occur for days or weeks. It has been noted by multiple observers that chameleons in the wild often do not drink during the day when it rains and that they remain well hydrated even during the dryer portions of the year. The hypothesis is that the chameleons are breathing in a substantial amount of atmospheric water vapor during the night keeping them well hydrated. This high night time humidity is often not replicated in captivity and dehydrated chameleons are commonly seen. Many keepers are now instituting a more natural hydration scheme utilizing cool-mist humidifiers to direct moisture-laden air into the chameleon’s enclosure during the night and early morning hours. If you have just one chameleon and one enclosure the cool mist can simply be pointed into the enclosure. If you have multiple enclosures some method of routing the fog into the enclosures via piping or tubing will have to be incorporated. After fogging for the majority of the night the enclosure is then allowed to dry out for most of the day (as it would in nature) to prevent water stagnation and pathogen proliferation. Using this method while still incorporating several misting sessions during the day now allows the chameleon to stay hydrated twenty-four hours a day. While this new hydration scheme is still in the early stages of large scale use there are many successful keepers, including myself, that have observed positive results from incorporating night-time fogging into their care regimen. The most important consideration with this is to make sure that the enclosure does dry out during the warmer portions of the day. A constantly wet environment can lead to a host of health problems.

Feeding

Minor’s chameleons are exclusively insectivorous (insect-eating). You should provide your chameleons with a variety of feeder insects that have been properly gutloaded and supplemented. My subadult and adult Minor’s are primarily fed crickets. I also occasionally feed Turkistan roaches, bean beetles, and fruit flies. Crickets are allowed to roam freely in the enclosure to entice the chameleon to search for prey and hunt. Roaches are placed in an elevated feeding cup so that they don’t hide in the enclosure. Dubia roaches are often ignored as they don’t move very much in the feeding cup. Smaller feeder insects, like bean beetles and fruit flies, are often overlooked for adult chameleons but it is very natural for chameleons of all ages to eat many small insects throughout the day as opposed to a few larger ones.

Crickets and roaches should be properly gutloaded before being offered to the chameleon. I feed my insects a variety of greens, fruits, and vegetables. Often, I use leftover produce from my own fridge that is starting to go bad. I commonly use kale, dandelion greens, collard greens, carrots, sweet potatoes, apples, and bananas.

I dust my feeder insects with Repashy Calcium Plus powder supplement. Juveniles and males get their food dusted with the supplement powder at every feeding. Females can be more prone to oversupplementation which is often expressed as edema (swelling of the neck region) so are supplemented less frequently, every other feeding.

My juvenile Minor’s chameleons are fed every day as much as they will consume. Be careful not to add too many insects so that the chameleons are overwhelmed with insects crawling all over them. Adult animals are fed every other day. I have never encountered an obese male Minor’s chameleon and I allow them to regulate how much they want to eat. On the other hand, female Minor’s are very prone to obesity and their food intake should be carefully monitored. An obese female is much more prone to deadly health issues associated with egg production and laying (more on that in the

breeding section). A healthy chameleon should not have tail bones visible. The skin should be smooth and flush. The eyes full. They also should not be overly round or bulging. It can take some practice but continuously monitoring and adjusting food intake is something that must be considered with females of this species.

Breeding

Minor's chameleons can be prolific breeders under ideal conditions. Both males and females are usually ready to mate for the first time at six to nine months old. Females signal their readiness to mate by the development of red and blue dots on their flanks as well as similar red on the head. Mature males will rarely turn down an opportunity to mate. When you suspect a female is ready to mate you can place the pair together. If she is receptive then she will stay softly colored, not move much, and barely react to the male. If she is not ready to mate she will puff up with mouth open and possibly lunge at the male to repel him. Unreceptive females should be removed right away and you can try again in a few days. If the female is receptive the male will head bob and mating usually begins quickly. Copulation anywhere from five to thirty minutes. Sometimes one mating is all a female will accept before becoming unreceptive and aggressive towards the male. Sometimes they will mate several days in a row before she becomes unreceptive. I always separate them when I am not present to watch. They can be an aggressive species and cause real harm to each other. Egg laying can be the most challenging part of breeding Minors. From talking with other breeders the biggest problem with this species is females retaining eggs and becoming egg-bound, a fatal condition. Based off of my own experience I have not found this to be a problem as long as the female is kept in proper condition. Many people mistakenly feed their chameleons as much as they will eat. This will quickly lead a female to becoming obese and result in egg laying complications. Keeping the female well fed but athletic will result in a healthy female and properly deposited eggs. See the Feeding section for more detail. Anywhere from fourteen to thirty-five days after breeding the female will be ready to lay her eggs. A day or two before egg laying the female will usually stop eating. This is when I will place her in the laying box. I use a fifteen gallon black plastic trash can as an egg laying site. A 20-40 watt heat light is placed on the top. The inside of the container has a six to eight-inch layer of soil. I use a 50/50 mixture of sand and organic potting soil. The key to getting the female to dig and bury her eggs is to have the soil at the appropriate moisture level. The soil should be very wet but without standing water. Whenever I have had a female not dig it was because the soil was too dry. I will leave the female in the egg laying container all day when the lights are on and return her to her terrarium at night. The next morning, I will water her heavily and offer food. After a drink she goes back in the container. This is repeated until she lays the eggs. Even if the female does not bury her eggs and instead scatters them on the surface there is still a good chance of saving the eggs as long as they are found quickly before they dessicate. I have had clutches of anywhere been seven and eighteen eggs. Eggs are incubated in lightly moistened vermiculite. Thirty grams of purified water are added to thirty grams of vermiculite in a sixteen-ounce deli cup. No holes are used in the deli cup. The method that I currently use to incubate all of my chameleon eggs is to incubate the eggs at 72°F for forty-five days then lower the temperature to 60°F for forty-five days. After the forty-five days of diapause the eggs are again incubated at 72°F for the duration of incubation. In order to achieve these temperatures an incubator that heats and cools is recommended. I have been using incubators made by DVM Exotics for years now with great results. Quality and customer service is excellent. Incubation time is lengthy and averages around nine months.

Hatchling care is identical to adults except on a smaller scale. Even hatchlings are very aggressive toward conspecifics and should be housed individually in smaller enclosures. Food items include fruit flies, bean beetles, and pinhead crickets. They will grow rapidly with appropriate care and will be nearing adult size in as little as six months.

Handling and Interaction

Minor's chameleons, like most chameleons, are not good pets for regular handling sessions. They are generally non-aggressive and rarely offer to bite but they are often afraid of being handled and that should be limited as much as possible. Taking the animal out every few weeks for a detailed inspection or a photo shoot is not a problem if it's limited to a few minutes. Allow the chameleon to walk on your hand and do not actually grasp the animal. In general Minor's chameleons are a beautiful "look but don't touch" species to keep.

Conclusion

Minor's chameleons, especially females, are able to express some of the most beautiful colors and patterns in the animal kingdom. For the intermediate to more advanced herpetoculturist they are a perfect breeding project as captive bred individuals are relatively hardy. They are still extremely rare in captivity though so finding some may be the biggest challenge in keeping them. There are only a handful of people working with them in the USA and most people that have them only have a pair or two. I was lucky enough to acquire the largest and most diverse breeding group of this species in the country and have been fortunate enough to achieve positive breeding results. At the time of this publication I am incubating many clutches from multiple pairs that should be hatching throughout 2018 and 2019. I hope to be able to offer them to the herpetocultural community as early as late 2018.