



# Milwood Animal Clinic

*"Where pets are a part of the Family"*

5942 Lovers Lane · Portage, MI · 49002

Phone (269) 342-9865

Fax (269) 342-6830

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## Leopard Gecko Care

### Supplies:

- 10 or 20 Gallon Aquarium or larger (larger for multiple geckos)
- Metal screen aquarium top (plastic will melt)
- Light fixtures for UVB bulb
- Compact Fluorescent UVB bulb
- Automatic timers for lighting and heating elements
- Under-tank heating pad
- Glass aquarium thermometers (2-3)
- Hygrometer
- Reptile Carpet or paper towel for cage bottom
- Hiding logs or rocks
- Sphagnum moss
- Branches and/or rocks to climb on
- Water and food dishes
- Insect Pen
- High Calcium Gut Loading Diet for insects
- Reptile Calcium
- Reptile Vitamin powder
- Large Tupperware tub or dish tub for bathing
- Spray bottle for misting
- Insects for feeding

### Captive Housing:

An aquarium is a perfect home for a Leopard Gecko. A long aquarium is better than a high one because Leopard Geckos do not climb a lot. A 20 gallon long aquarium is adequate for up to 3 geckos. A secure mesh cover for the aquarium is necessary to prevent escape. The cover should be metal so it doesn't melt from the heating elements. Make sure that you **only have one male** per enclosure as males will fight. Also keep only geckos of similar size together; larger geckos will pick on smaller geckos. Safe substrates include reptile carpet, newspaper, and paper towel. Sand is not recommended because some geckos will ingest sand and develop intestinal impaction. Rocks and logs can make the terrarium more natural looking and they provide your lizards with places to climb and get exercise. A hide box/log/rock is absolutely necessary for each lizard for use in times

or conflict, for sleeping, and to provide a micro-habitat of elevated humidity (more on this below). It is a good idea to provide 2 hide boxes (more if you have multiple geckos in one cage) - one on each side of the tank.

The location of the cage is also very important. It should be located in an area with minimal fluctuations in temperature and humidity. Some poor location choices include: near a window where sunlight can overheat the tank, near a door where drafts can cause an unhealthy drop in temperature, in a bathroom where humidity levels can rise to unhealthy levels.

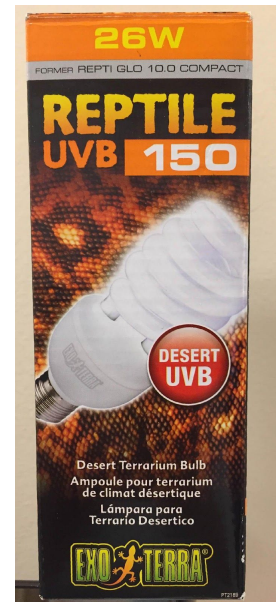
### **Lighting:**

Ultraviolet light is important for most lizards. The UVB light that comes from the sun allows lizards (and many other animals) to produce Vitamin D in their skin. Vitamin D then travels to the lizard's intestinal tract and makes it possible to absorb calcium from the diet. Without Vitamin D, no calcium can be absorbed.

Although leopard geckos are naturally nocturnal they do require some ultraviolet light. It is believed they are active at dawn and dusk and are exposed to low levels of UV light at those times. We often diagnose Metabolic Bone Disease (low calcium levels from lack of Vitamin D3) in this species and recommend at least a few hours of UV exposure per day.

There are many UV (sometimes referred to as full spectrum light) bulbs on the market. Most claim that they duplicate the sun's light spectrum; however there is no bulb that can achieve the intensity of ultraviolet light emitted by the sun. Some bulbs provide so little UV light that they are completely useless, and some are so powerful that they can burn the reptile. We recommend the Exoterra Reptile UVB 150 Desert bulb for Leopard Geckos. This bulb does not put out heat so you will likely need to provide one or more sources of heat for your gecko's habitat (discussed below). Make sure the light from the bulb is not impeded by a glass or plastic cage cover (wire mesh is ok). Even though glass or plastic allows visible light to pass through, the invisible UV spectrum of light is usually blocked. Your UV lights must be changed at least every 6 months in order to provide adequate levels of UVB spectrum lighting. Humans can't see the UVB wavelength so there is no way of knowing when that spectrum of the light has died off. We can test your bulb's UVB output for you to help you decide if it is time to replace the bulb. We recommend testing your bulb when you first purchase it to make sure the bulb is good and then every 2-3 months thereafter. Call us for more details.

The lighting cycle should be 12 hours of light and 12 hours of darkness. Using an automatic timer to turn your lights off and on is very helpful in regulating your light cycles. Just like humans, reptiles need complete darkness at night. If you need to provide supplemental heat at night, use an under-tank heating pad, a ceramic heating element, or a nocturnal reptile bulb. Never use a white light of any sort at night, for lighting or for heat.



This will stress your animal, eventually affecting its ability to thrive through the resultant lack of sleep, loss of appetite, and other stress-related symptoms.

### **Temperature:**

**Hot Spot – 90°F**

**Cool Spot – 75°F**

**Night-time – 70-72°F**

The importance of proper temperature cannot be overstated. Because lizards are exothermic (cold-blooded), they rely on their environment to maintain their internal body temperatures. Ideal body temperature varies from hour to hour, depending on what activity the lizard is engaging in. This is why providing a temperature gradient or range is so important. Metabolism, digestion, and immune function all rely heavily on a lizard's body temperature. The lizard should be able to move freely between temperatures to self-regulate.

Setting up a proper temperature gradient takes a little trial and error. Establish a warm area on one side of the tank where the temperature is around 90°F. The opposite side of the tank should be the "cool area" (around 75°F). Usually an under tank heater on one side of the tank will provide enough heat to keep the warm side around 90°F while keeping the cool side of the tank around 75°F in a 10 gallon aquarium. Larger aquariums may need additional heating elements (such as a ceramic heating element) to maintain the proper temperature gradient. It is best to do this before you purchase your gecko so you don't stress it while you are making adjustments. If you keep your home temperature around 70-72°F you can turn off all heating elements at night to allow the night time temperature to drop down to 70-72°F.

Under tank heating pads are specially made for reptile habitats, do not use a drug store heating pad. Do not use heat rocks in the tank as they do not provide adequate heat for air temperature and are a common cause of burns in reptiles. Reptile heating pads usually come with little stick-on "feet" to put on the bottom of your aquarium and prevent the weight of the aquarium from putting pressure on the electric cord. Be sure to use these or something similar to prevent damage to your heating pad's cord, which could pose a fire hazard. The heating pad also has a sticky side that can be used to stick it to the bottom of the aquarium. We don't recommend sticking the pad to the bottom of the tank for 2 reasons: it will be easier to clean the tank that way and it will prevent hot spots from forming on the bottom of the aquarium.

Have at least three thermometers in the cage to check your temperatures: one on the cool side, one on the warm side, and one inside the hide box/rock/log. Place them where your pet spends its time, not just where it is convenient for you. Check your temperatures often - at least once during each season - because ambient temperatures change with the seasons and this, in turn, will affect the temperatures within your gecko's cage.

### **Humidity:**

Although Leopard Geckos come from arid regions, they tend to dig down into damp burrows which provide the necessary humidity to allow for proper skin shedding. Place a hide box or hide rock over the area of the under tank heater and arrange damp

sphagnum moss inside the hide box. Spray the moss daily with water to maintain humidity. Change the moss weekly to prevent bacteria or fungal growth. This area of increased humidity will allow your gecko to properly shed its skin (which it will eat). Growing leopard geckos can shed their skin as often as every 4 to 7 days so they need to access this humidity box often. The humidity of the rest of the cage should be about 40%. Use a hygrometer to monitor cage humidity.

### **Feeding:**

Leopard Geckos are insectivores. Juveniles should be fed daily and adults can be fed every other day. Since these lizards consume a wide variety of prey in the wild, a variety of protein sources must be offered in captivity. Commercially available insects include crickets, dubia roaches, mealworms, superworms, Phoenix worms (black soldier fly larvae), hornworms, silkworms, bean beetles, fruit flies, springtails, wood lice (aka sow bugs, pill bugs or roly-polies), and wax worms. You can also catch your own insects to feed to your lizard - just make sure they are not from an area that has been treated with insecticides or herbicides and the insect you are feeding is not poisonous. Examples of acceptable wild caught prey to feed include: moths, cicadas, flies, crickets, small grasshoppers, spiders (non-venomous), cockroaches, wood lice (aka sow bugs, pill bugs or roly-polies), earthworms, slugs, and aphids.

**DO NOT FEED** fireflies, venomous spiders, large (lubber) grasshoppers, stinging insects, monarchs and other toxic caterpillars, fire ants, stink bugs, or scorpions.

### **Gut-Loading:**

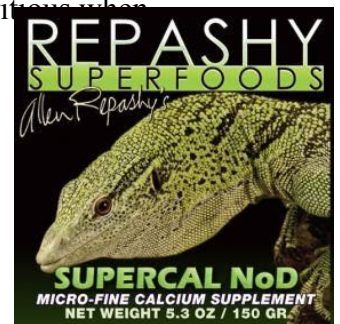
Gut loading refers to feeding your insects a high-calcium, high-vitamin diet 12 to 24 hours prior to feeding them to your pet. Most insects are nutritionally deficient with the exception of their stomach contents so gut-loading improves their nutritional content.

We recommend and sell Mazuri High Calcium Gut Loading Diet for crickets, mealworms, superworms, Dubia roaches.

In addition to providing essential vitamins, this diet is formulated to contain a high level of calcium for crickets and other feeder insects which are intended to be used in the diets of other animals. It helps balance the calcium to phosphorus ratio of the crickets and other feeder insects when they are consumed by other animals. Provide water with a damp paper towel or cotton ball. Do not use cricket cubes or vegetables as a water source because the insects will preferentially eat these items and will not be as nutritious when fed to your pet.

### **Supplements:**

Sprinkle or dust prey with a calcium supplement just before each feeding. We recommend and carry Repashy SuperCal. An easy way to coat your insects with the powder is to use a small tupperware container with a layer of the calcium powder on the bottom. Drop your insect in the container, cover, and shake gently until the insect is coated with powder.



We recommend Repashy SuperVit for multivitamin supplementation. Insects should be dusted with the multi-vitamin supplement once or twice monthly as long as the Mazuri Gut Loading Diet is being fed to the insects.

**Water:**

Fresh water should be provided in a bowl inside the cage. The water should be changed and the bowl washed daily. Leopard Geckos often will not drink from a water bowl so it may be necessary to mist the cage furniture/plants daily to allow your Gecko to drink from water droplets. Some geckos enjoy a periodic water bath. The baths encourage drinking water. A clean dish tub or plastic storage container makes a good bathtub: add enough lukewarm (not hot!) water to just cover your lizard's tail. This will allow the gecko to drink the water and paddle around without risk of drowning. Allow your lizard to soak for 5 to 10 minutes. Soaking may also stimulate a bowel movement which helps prevent constipation, another common problem with geckos. Always supervise your pet when it is taking a bath.

# Cleaning, Disinfecting and Sterilizing

How they are different and why you need to know

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## A Brief History of Antisepsis

The two perhaps most important contributions to antiseptic procedures in the medical arts both happened during the last 150 years. The French chemist and microbiologist Louis Pasteur set the stage for the later appearance of British surgeon John Lister (1827-1912) who pioneered antiseptic operating room procedures (and after whom Missouri physician Joseph Lawrence named his antibacterial mouthwash). In a time when surgeons operated in their street clothes, surrounded by similarly clothed (and septic) onlookers, and just after surgical instruments were finally being washed in soapy water between operations, Lister campaigned for heat or chemical sterilization (and for surgeons to use something other than sawdust swept up from the floors of the mills, used in surgical dressings). William Stewart Halsted (1852-1922) furthered the cause of antiseptic technique with his introduction of surgical gloves. [The word sepsis is a noun that relates to the presence of organic pathogens (disease-causing organisms) in the blood or tissue; "septic" is the adjective. "Antisepsis" is the noun meaning destruction of such organisms; "antiseptic" is the adjective.]

To many people, these three terms--cleaning, disinfecting and sterilizing--are synonymous but the fact is that they stand for three discrete processes. What you know--or don't know--can at best be a waste of time and money for you; at worst, it can make you ill and be deadly to your animals.

## Cleaning

Cleaning is the general removal of debris (food, feces, urates, blood, saliva and other body secretions) that helps reduce the amount of organic matter that contributes to the proliferation of bacteria and diseases. The more debris that is removed at the cleaning stage, the better able your disinfectant will be able to do its job. Most disinfectants cannot work their way under chunks of debris or smears of blood on the tank or utensils; if any bits remain stuck on, use a little elbow grease--or a putty knife dedicated to cage cleaning--to work it off. Before really getting into it with a scouring sponge or pad, test a small area of the tank to see if it is going to abrade the surface of the tank. Repeated scratching may be unsightly, but worse is the fact that it provides lots of nooks and crannies in which bacteria and other beasties can hide.

Cleaning is best done with hot, soapy water. The hot water and surfactants in the soap work to loosen debris stuck to surfaces. Clean rinse water flushes it away. When you are cleaning enclosures that cannot be taken to a tub, sink or outdoor hose to be thoroughly rinsed out, it must be done with sponges, rags or paper towels. In any case, you must completely rinse out or wipe off all soap residues as some ingredients may interfere with the work of the disinfectant.

A simple cleaning may involve the removal of animal waste and the substrate surrounding it. If the substrate is paper, the entire substrate should be changed. If the enclosure is lined with outdoor carpeting or artificial turf, it should be removed and a clean piece placed in the enclosure. (Rotating pieces allows enough time to thoroughly clean, disinfect and dry the soiled piece.) If the animal waste, food, or fluids from prey have come into contact with the floor or walls of the enclosure, then they should be disinfected after the areas have been cleaned.

Almost any good liquid soap can be used for cleaning. Simple Green™ and regular dishwashing soap both work well; be sure to dilute products such as Simple Green according to manufacturer's directions. There is no need to bother with soaps advertised as "antibacterial" - all soaps are antibacterial in that they, in conjunction with hot water, help remove bacteria from surfaces. Antibacterial soaps are not disinfectants and should not be used in place of a proper disinfectant. Do not use soaps or cleansers which are abrasive, contain pine scents or phenols.

### **Disinfecting and Chemical Sterilization**

Disinfecting means pretty much what it says - it removes most of the organisms present on the surface that can cause infection or disease. Disinfecting is not suitable for eradicating mites but is useful against a number of bacterial and viral microorganisms. Sterilization, on the other hand, is the killing or removal of all disease causing organisms. Often the same products may be used to disinfect and to sterilize; the difference is in the strength of the solution and/or the amount of time the solution is left in contact with the surface.

There are many products on the market that may safely be used (when directions for use are carefully followed) to disinfect reptile and amphibian tanks. Two may be found on your grocer's shelves - chlorine (household) bleach and ammonia. Both are highly toxic to you and your animals and must be used with extreme care. Other disinfectants may be purchased through animal supply catalogues, industrial supply houses and feed stores: Roccal-D™, a quaternary ammonia compound, and Nolvasan™ (chlorhexidine diacetate). The latter is useful to have in the herper's collection of supplies because in its dilute form it may be used to flush wounds, treat stomatitis (mouth rot) and soak syringes and feeding tubes. These products are expensive, ranging from \$35-55 but, when diluted according to manufacturer's directions (Nolvasan, for example, is used at the rate of 3 ounces per gallon of water) they will last a long time (depending upon the number of enclosures, furnishings and utensils). Bleach should be used at the rate of 4 ounces per gallon of water, ammonia at 3.5 ounces per gallon. Note that weaker solutions should be used on amphibian enclosures and furnishings.)

To disinfect surfaces, generously apply the solution to the surface with a saturated cloth, sponge or spray bottle, or let the object soak in a container of the solution. Let the solution sit for at least 10 minutes; 15-20 minutes is better. To sterilize, let the solution sit for at least one-half hour (be sure to check the manufacturer's directions to see if a stronger solution is necessary for sterilization). Rinse out thoroughly, especially when using bleach or ammonia. If there is any doubt about your ability to thoroughly rinse out an enclosure, or the enclosure is made of wood, you may wish to think twice about using bleach or ammonia. Any residual of these substances left in the tank can cause severe, if

not fatal, problems for your animals. Both substances produce strong fumes that can cause internal and external irritations. (Simple Green's aroma is artificial sarsaparilla and is not toxic to reptiles; no information has been found in reference to its use in amphibian enclosures.)

### **Now Comes the Fun Part**

It doesn't make any sense to use disinfectants if you spread organic matter from one animal's enclosure to another on your sponge, rag, gloves or utensils. While your risk of cross-contamination is reduced in a long-established closed group of animals, any group that is subject to change, with new animals coming into the group (not necessarily into the same enclosures as established animals) then the risk of cross-infection is high.

### **Cleaning Equipment and Supplies**

A set of equipment and supplies should be dedicated to new animals. In large groups of established animals, the threat of cross-contamination can be reduced still further by dedicating a separate set of equipment and supplies to each type of animal: snakes, lizards, turtles and tortoises, amphibians.

The cleaning equipment and supplies required include:

- disposable gloves
- sponges
- scrapers (such as a putty knife)
- glass or metal bowls or buckets for hot soapy water and for the rinse water
- paper towels, sterilized cloth towels or rags, or disinfected sponges
- disposable trash receptacle such as a paper or plastic bag.

Items such as feeding and water bowls, rocks and ceramic, plastic or rock caves and hide boxes should be removed, cleaned and disinfected (as described below) and set aside; they can be placed back into the enclosure once the substrate and tank have been taken care of. Water bowls should be disinfected weekly in a bleach solution.

The disinfecting and sterilization equipment and supplies required include:

- disposable gloves
- a spray bottle or bucket of prepared disinfectant solution
- a metal or glass or bucket of fresh rinse water and two for disinfectants.
- large receptacle for soaking and disinfecting furnishings (bowls, rocks, caves).

Utensils such as scrapers, rags, sponges, snake tongs or hooks, and reusable rubber gloves should be washed in soapy water, then soaked in one disinfectant (such as a chlorine solution) for at least five minutes. The utensils are then rinsed thoroughly before being used again. The second container of solution (such as Nolvasan) is used to disinfect the enclosures.

### **The Process**



Begin working with your established, healthy, animals. Once you have finished their enclosures, clean and disinfect your utensils. Move on to any established animals that are ill. Clean and disinfect the utensils before starting to work on the quarantined animals last. (The idea of having separate sets of utensils and spare rags and sponges begins to not sound so crazy, after all...) Clean and sterilize the utensils, sponges and rags after you are finished.

Needless to say, this can make cleaning a frustratingly time-consuming task if only one set of utensils is used. So splurge and buy a couple of inexpensive putty knives. Hit your local thrift shops for old towels and sheets to (rip into rags) and old mixing bowls.

Sponges can be bought in packages of 8-10 to a pack. Save shampoo and similar bottles to store smaller quantities of your disinfectants so that you are not always working with the heavy gallon bottles. With all the waste and trash that gets dumped into our landfills, it is nice to know that there are ways that we can reuse and recycle.

Rags, towels, cloth bags and sponges may be sterilized by soaking in ammonia for 30 minutes in a well ventilated place away from the animals, then washing thoroughly in hot soapy water and allowed to dry. Bleach may also be used for this purpose, but after a time it begins to destroy the integrity of the fabric. This isn't a major problem if you buy your towels and rags at thrift shops.

If at all possible, establish a routine. Check enclosures daily for messes that can be quickly cleaned. Schedule one day a week to do a complete cleaning of all enclosures. This is a good time for animals that are otherwise enclosure-bound to get some fresh air and sun, or a nice long soak in the tub while you slave away in their tanks. Crank up the music, plop a drop cloth on the floor if you tend to be a klutz like me, and go to it...it's a dirty job, but somebody's gotta do it.

### **Recipe for Glass and Window Cleaner**

Into a clean, empty gallon bottle, pour:

- 1 quart rubbing alcohol
- 1/4 cup vinegar
- Just a few drops of liquid soap

Fill up the rest of the bottle with clean water; distilled water is preferred but not essential. Shake well. The mixed cleaner can be poured into spray bottles, or directly (I would advise using a funnel) into your windshield wiper cleaning fluid container. Just spray it on and wipe as usual. For stubborn spots, spray some on the spots, let sit for a minute or so while you work