Milwood Animal Clinic
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Aquatic Turtles

Minimum Requirements

- Appropriate sized habitat
- High quality water filter
- UVB lamp
- Heat lamps
- Area to dry and sun, area to swim
- Aquarium heater
- Calcium & vitamin supplement
- Appropriate diet

Captive Housing

All aquatic turtles need both a warm, dry basking area (dock) and warm pool of water, to thrive. The easiest way to accomplish this is with a large aquarium. The depth of the water should be at least as wide as the turtle's shell. If you have a hatchling turtle, you may wish to start with a smaller aquarium (20 Gallon), with a shallow area to swim (3-6 inches). Adults will need a much larger aquarium (100 gallon or more) with the water area that is deeper (10-30 inches). The basking area should be easy for the turtle to get up on and include either real or artificial plants, so that the turtle can hide and have a sense of security.

Water Quality

The quality of the water is critical to your pet's well being. Using an aquarium filter is a necessity in order to keep the tank clean. A canister filter rated for an aquarium much larger than the actual size of your aquarium will work best for an adult turtle as it can handle a larger job and is easy to clean. Even with a filter, you will need to replace at least 50% of the tank's water every week and completely empty and clean the tank at least once a month. Feeding your turtle in a separate tank will also improve the quality of your pet's living environment.

Temperature and Lighting

Water temperature should stay between 75° and 85° year round. In the wild, turtles prefer the warmer water that has been heated by the sun. Appropriate temperatures can be accomplished with a submersible aquarium heater.

The basking dock should have a heating and UVB (Ultraviolet B) bulb shining on it. UVB light, which aquatic turtles usually get from the sun, is essential for them to survive. They use the light to produce Vitamin D which helps them absorb calcium from their diet. You will need to use a UVB light during the daylight hours (about 8-12 hours) for your turtle. This will help to simulate natural sunlight. The light should be positioned over the basking area and be used in conjunction with a heat bulb, if necessary, so that the warmest temperature is approximately 90°. There are several full spectrum fluorescent light bulbs on the market. Most claim that they duplicate the

sun's light spectrum; however it is unlikely that any can achieve the intensity of ultraviolet light emitted by the sun. Some bulbs provide so little UV light that they are nearly useless, and some are so powerful that can burn your pet. We recommend Zoo Med Power Sun Mercury Vapor bulb or Exoterra Reptile UVB 150 Desert Compact Fluorescent bulb for your turtle. Mercury Vapor bulbs have the advantage of providing both UV light and heat, often eliminating the need for an additional heating bulb. We can test the UV output of your bulb to make sure you are providing the highest quality artificial UVB light possible. UV bulbs must be changed every 6 months because the UV output tends to fade away within this time frame (even though they may still be producing visible light).

Using an automatic timer to turn your lights off and on is very helpful in regulating your light cycles. Make sure your bulbs are far enough away from the turtle to prevent burns (usually at least 8 inches) and from the water to prevent water from splashing on them. Water and hot lights do not mix! If water splashes on a hot bulb, it could explode. We can make more specific lighting recommendations at your turtle's appointment.

Diet

Juvenile turtles should be fed daily and require more protein than adults. Adults should only to be fed once every 2 or 3 days. Diets should consist of approximately 50% plant matter, and no more than 25% protein (live prey), and 25% commercial pellets.

Aquatic turtles also enjoy a variety of aquatic vegetation such as duckweed, water lettuce, water hyacinth, etc. See the list of Nutritious Leafy Greens on the next page for an extensive list of grocery store greens you can feed your turtle.

Protein sources can include earthworms, mealworms, superworms, bloodworms, guppies, feeder fish, and brine shrimp. It's best to have a separate tank designated for feeding your turtle. If you are feeding in the main tank, remove all food from the tank as soon as your turtle loses interest. Better yet, use a separate feeding tank that can be emptied and cleaned easily. This will help to keep the turtle's habitat clean, reducing odors and sources of contamination.

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

REPASHY
SUPERFOODS

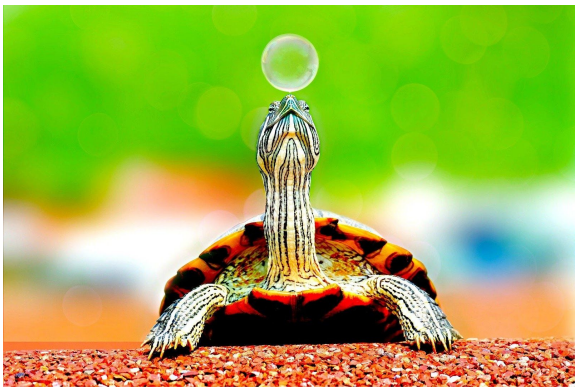
In addition to the nutritious diet described above, your tortoise will need vitamin and mineral supplementation. A pinch of calcium powder should be sprinkled on the food daily. We recommend Rep-Cal or Repashy SuperCal. For vitamin supplementation we recommend Repashy Supervite sprinkled on the food twice a month.

Health Problems

Health problems that are common to aquatic turtles are often a result of improper husbandry. Poor diet, low temperatures, poor hygiene, lack of UVB light, and lack of calcium or other vitamins can cause a variety of health issues.

Watch for fungus on the turtle, which can be small black or white spots or fuzzy lumps on the fleshy parts of the turtle. Shell rot appears as discoloration of the shell and is often accompanied by a foul odor. Swollen eyes, ears, and nasal or ocular discharge can be serious, and should been seen by your veterinarian. Also watch for any changes in appetite, activity, and bowel movements.

It is also important to note that turtles, along with many other reptiles, can carry bacteria (such as Salmonella), which can be transmitted to humans. It is important to wash your hands very well after handling your pet turtle or its environment.



Nutritious Dark Leafy Greens

These vegetables are excellent food sources for many small animals including herbivorous and omnivorous reptiles, birds, rabbits, guinea pigs, and other herbivorous mammals.

Feed the following greens in abundance:

Arugula
Basil
Cilantro
Clover (no pesticides or herbicides)
Dill leaves
Endive*
Escarole
Mint
Peppermint leaves
Radicchio
Raspberry leaves
Red or Green Leaf Lettuce
Romaine lettuce (no iceberg or light colored leaf lettuce)*
Dandelion greens and flowers (no pesticides or herbicides)*
Watercress*
Wheat grass

The following greens should be fed less often and in smaller amounts:

Alfalfa, radish & clover sprouts^
Beet greens (tops)^*
Bok Choy†
Brussels sprouts^†
Carrot tops^*
Collard greens†^*
Kale†*
Mustard greens†^*
Parsley^*
Radish tops^
Swiss Chard^
Spinach †^*
Turnip Greens†^

* Contains high amounts of Vitamin A, which is good for skin health
^ Contains high amounts of oxalates & may cause health problems if fed often. Use sparingly.
† Contains high amounts of goitrogens & may cause health problems if fed often. Use sparingly.

Cleaning, Disinfecting and Sterilizing

How they are different and why you need to know

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 mouth wash). 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 (mouthrot) 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.