

Environmental Enrichment for Reptiles

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For years, standard practice for reptile housing was to keep the animal in a minimalistic enclosure. The thought was that the reptile simply did not care about its housing (**Figure 1**). For the most part, reptile breeders had success with this setup with regard to reptile reproduction and fecundity (**Figure 2**). The standard line was that if a reptile was given a heat gradient, a light source, and a place to hide, then it would be happy (**Figure 3**, next page). A similar minimalistic approach to cats or dogs would be quickly labeled as less than ideal.

Environmental & Social Enrichment Requirements

It is well established that all animals need to be able to perform biologically appropriate behaviors while in artificial environments.¹ Housing essentials should be determined by the caged animal's natural biology. Although it may be unrealistic to review wild-matched husbandry conditions for all reptile species, it is not unrealistic to make the effort to provide proper housing and nutrition for the 3–4 dozen species that are regularly kept as pets.

Reptiles that would normally live for 2 or more decades under natural conditions often languish in captivity and succumb at an early age.¹ This is largely because the diet, ambient or environmental temperature, relative humidity, and lighting (appropriate wavelengths and photoperiods) provided to captive animals often do not parallel those that the animals have evolved to require. This dearth of environmental essentials is sufficient to induce stress and ultimately overwhelm the animal's natural immunity to disease.¹ Stressed animals rapidly become immunocompromised, predisposing them to opportunistic infections, ulcers, and disease.

In relatively recent times, the need for these basic essentials has received more attention, and environmental enrichment is now a priority in captive environments.¹ Zoos, aquaria, and facilities housing captive animals are not only encouraged but, in many cases, required to provide for the psychological well-being of the species.

Environmental enrichment includes appropriate physical husbandry and psychological stimulation, and it provides the foundation for captive reptiles to display natural behaviors and experience minimal stress. This enrichment includes the necessity for natural terraria and mental stimulation.

An excellent way to provide the latter is to encourage natural behaviors. This can be accomplished by rewarding natural and shaped behaviors. Physical and mental

There are an estimated 10,000 species of reptiles, but only a small percentage are routinely kept as pets. Even with this relatively small population, their requirements are as varied as night and day.



1 Common housing for water turtles. These turtle bowls were popular years ago but can still be found in pet stores today.



2 Large-scale breeders traditionally keep their snakes and lizards in sweater box cages. These cages are simple and easy to clean but provide no environmental stimulation.

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Housing essentials should be determined by the caged animal's natural biology.



3 Although easy to maintain, these minimalistic cage enclosures provide little in the way of environmental enrichment for the captive animal.

enrichment has become standard practice for most professional zoologic facilities, and veterinary professionals should encourage home reptile keepers to use enrichment practices.

Allowing a captive animal the opportunity to make choices (ie, think) provides mental stimulation. Instead of languishing in one spot, waiting for something to happen, they should have the ability to make things happen. For example, providing separate areas within the cage where food items can be hidden encourages foraging behavior (eg, in partitions, inside hide boxes, underground, placed high in branches). The active effort to find food can provide physical and mental nourishment.

These behaviors cannot take place in simple box units such as the standard sweater box or shelf units that are commonly used in reptile keeping (**Figures 2 and 3**). Although these units are efficient with regard to cleaning, maintenance, and ease of access to the reptile, they are environmentally and psychologically sterile.

Types of Enrichment

The Association of Zoos and Aquariums (AZA) defines enrichment as: "A process for improving or enhancing animal environments and care within the context of the inhabitants'

Three Fundamental Goals for Successful Enrichment³

1. Promote natural, species-specific behavior.
2. Provide opportunities that allow natural behavior.
3. Provide the animals the ability to make choices.

behavioral biology and natural history. It is a dynamic process in which changes to structures and husbandry practices are made with the goal of increasing behavioral choices available to animals and drawing out their species-appropriate behaviors and abilities, thus enhancing animal welfare."

Providing enrichment is not as difficult as one might think (see **Three Fundamental Goals for Successful Enrichment**). The basis for successful enrichment is a fundamental understanding of the species-specific natural biology. Research about where the animal lives, how it lives, what it eats, how it finds food, what its normal diurnal and annual rhythms are, its natural aging process, and its reproductive biology must be conducted. In addition, numerous companies now produce reptile care products that make providing these requirements relatively easy.²



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Realistic caging provides limbs for arboreal species, as well as branches and foliage to provide visual barriers. Natural or appropriate wavelength artificial lighting is mandatory for the well-being of captive reptiles.

Species-Specific Enrichment

Knowledge of the species' natural history can direct the design of a physical facility enrichment plan. Cage design will differ depending on whether the animal is fossorial (burrowing), terrestrial (land dwelling), arboreal (tree dwelling), aquatic (water dwelling), or a combination of these. A terrestrial snake that does not burrow does not need deep substrate, whereas a fossorial snake will be markedly stressed in an enclosure that has no soft bottom for digging. Providing sand, soft soil, a water source deep enough for swimming, and trees can all be added to captive environments to enhance these natural behaviors.

Some reptiles are diurnal (active in daylight) while others are nocturnal (active at night). Feeding during appropriate times will help with appetite and food acceptance. Again, some reptiles will eat off the ground while others will eat while climbing in a tree. Aquatic species may need to eat in the water (eg, fish eaters).

Food & Drink

While it is generally considered bad practice to feed live prey (eg, mice, rats) to the animal, the owner can encourage foraging by taking dead prey and scenting the cage by dragging the prey around the cage, along the walls, or over rocks. This provides a scent trail for the reptile to follow.³ In addition, many reptiles learn to drink from a water bowl, but others, such as the veiled chameleon, only drink from dew-dampened leaves. Setting up a misting system or a rainforest enclosure can provide the needed moisture to allow water to accumulate on the surface of the foliage, thus providing proper access for these unique species.

Social Enrichment

Some reptiles are receptive to humans and appear to seek out contact, but others are known to be more reclusive and require places within their enclosures to hide. Housing a delicate chameleon in a cage with minimal hiding space located in a busy room with loud noises and constant activity is a recipe for disaster. Knowing the species and providing appropriate housing and accessories helps ensure a low-stress environment and a healthy captive (**Figure 4**).

Many reptile species are solitary, meaning they do not need companionship from conspecifics. Contrary to what the pet store clerk may tell the owner, the green iguana does not need a cage mate. In fact, pairing animals that are not gregarious can often be a source of lethal stress.⁴ Larger animals often crowd or threaten smaller conspecifics, preventing them from access to food and water. In addition, larger or more aggressive cage inhabitants may physically injure smaller or more timid animals.

The basis for successful enrichment is a fundamental understanding of the species-specific natural biology.

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Training as a Form of Enrichment

For years, zoos have trained mammals to do specific behaviors—a dolphin may be trained to present its tail for a routine blood collection, or an elephant may learn how to hold up a foot for a nail trim. The assumption was that reptiles were not suited for this type of training, but this is incorrect, as many institutions have instigated target training for reptile species.

For example, Komodo dragons are trained to enter a crate for weight measurement and blood draws, and crocodiles are crate trained to allow for similar behaviors and ease in transport. At one facility, the keepers have trained the alligators to present for physical examinations by using gelatin cubes as rewards (**Figure 5**).

This human–captive interaction is stimulating for the animal and provides constant enrichment. ■ **cb**

Enrichment at a Glance

Goals to providing enrichment to captive reptiles include promoting natural, species-specific behavior:

- Provide opportunities that allow natural behavior.
- Provide the animals the ability to make choices.
- Ensure the captive has a sense of safety and security.
- Provide hide boxes, natural caves, dens, branches, and rocks.
- Encourage independent thought.



References

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2. **Stress in Captive Reptiles.** DeNardo D. In Mader DR (ed): *Reptile Medicine and Surgery*, 2nd ed—St. Louis: Elsevier, 2006, pp 119-123.
3. **Current Herpetological Husbandry and Products.** Barten SL, Flemming GJ. In Mader DR, Divers SJ (eds): *Current Therapy in Reptile Medicine and Surgery*, 2nd ed—St. Louis: Elsevier, 2014, pp 2-12.
4. **Lizards.** Barten SL. In Mader DR (ed): *Reptile Medicine and Surgery*, 1st ed—Philadelphia: WB Saunders, 1996, pp 47-61.

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This alligator has been trained to present for examination by rewarding it with gelatin cubes.

Photo courtesy of the Theater of the Sea.