

BEARDED DRAGON

By Catherine Love, DVM

Updated 2023

NATURAL HISTORY

The central or inland bearded dragon (*Pogona vitticeps*) is the most commonly kept reptile in the *Pogona* genus, and arguably the most commonly kept reptile in the world. There are at least 6 species in this genus including the central, eastern, and Rankin's, which all vary slightly in distribution and behavior. Central bearded dragons are native to the arid woodlands, shrublands, and rocky deserts of central Australia. Beardies are diurnal (active during the day) and proficient climbers, so they are often found basking on branches, fences, boulders, and stumps during the day. They are able to regulate their body temperature by moving in and out of shade or into burrows. When the temperature drops and the days become longer, bearded dragons brumate in burrows.

LIFESPAN

Dragons typically live 6-10 years but may live well into their teens with proper care.

ADULT SIZE

12-14 inches.



CHARACTERISTICS & BEHAVIOR

Due to their docile nature and curious personalities, bearded dragons are very popular pets. They tend to be tame, easily handleable, and are rarely aggressive when handled properly. Bearded dragons come in a variety of colors which in the wild coincide with the color of the substrate in their habitat. In captivity, breeding efforts have produced various color morphs.

The dragon's characteristic beard is found in both sexes, but males tend to have darker beards. A male's beard will darken to near black during courtship and mating. Beard flares are also used during predator defense and dominance displays. Alarmed dragons will open their mouths wide, puff out their throats, and flatten their bodies to make themselves appear larger. Bearded dragons are also capable of moderate color changes, which may play a role in temperature regulation and visual signaling. Recent studies have suggested an endogenous circadian rhythm in a bearded dragon's skin, with their skin lightening during dark phases and darkening during light phases. Unlike some other lizard species, bearded dragons are not capable of tail autotomy (dropping their tails). Bearded dragons are considered intermediate level reptiles, as their care requirements may be more in depth than novice keepers are prepared for.

HOUSING

The minimum enclosure size for bearded dragons is 4'x2'x2', or 120gal, but bigger is always better. Bearded dragons can be quite territorial and can seriously injure each other in disputes, so they are best housed alone. Dragons need climbing surfaces such as branches and rocks to allow them to exercise and move closer to or farther away from the basking source. These animals are often seen taking advantage of vertical surfaces in the wild, so all attempts should be made to give them opportunities to do the same in captivity. Fake or live plants can also add cover and enrichment for dragons, but curious dragons may eat live plants so ensure they are reptile safe. Flagstone can be used to set up basking rocks, and many keepers find that their dragons enjoy

BEARDED DRAGON

By Catherine Love, DVM

Updated 2023

LIGHTING

using hammocks. Reptiles should have at least one hide on the warm end of their enclosure and one on the cool end of their enclosure so they don't have to choose between thermoregulation and security. Rough surfaces such as rocks and branches help dragons file their nails and also aid in shedding.

There are few subjects in reptile husbandry that are as divisive as which substrate is best for bearded dragons. There is no "best" substrate; all have pros and cons. Loose substrate, when combined with improper husbandry, can lead to life threatening impactions. Tile and newspaper have no risk of impaction, but do not allow natural burrowing or digging behavior. Newspaper may be placed on top of tile to allow the dragon to burrow between layers. Tile offers the benefit of acting as a filing surface for a dragon's nails. It is best for young dragons to be kept on non-loose substrate, as their vigorous feeding responses make them more prone to substrate impaction.

In the wild, dragons live on substrate that is composed of 95.9% fine sand, 2.3% clay, 1.5% silt, and 0.3% gravel. There are a few options of replicating this in captivity, including commercial substrates and home-mixes. Custom Reptile Habitats offers Jurassic Natural Australian Desert Dragon Habitat, which is a substrate collected from the dragon's natural habitat in Australia. Lugarti's Natural Reptile Bedding, a combination of sphagnum moss, fine sand, and clay, is also an option. ZooMed Excavator Clay can also be used and offers the advantage of being able to make preformed burrows, but it can be quite expensive and messy. The Bio Dude TerraSahara is another acceptable choice, particularly for bioactive setups. Some keepers chose to make their own mix with 50% washed play sand, 30% topsoil (be sure it is reptile safe), and 20% Excavator Clay.

Avoid CalciSand, VitaSand, crushed walnut, gravel, and corncob as these substrates carry a much higher risk of impaction. Always talk to your veterinarian before using loose substrate to ensure your lizard is healthy and your husbandry is correct. When using loose substrate, food should also be offered on a feeding dish to avoid ingestion of substrate. Live prey can also be offered with tongs.

Like all lizards, bearded dragons require UVB light to synthesize vitamin D3 in their skin. Vitamin D3 is needed for proper metabolism of calcium and prevention of metabolic bone disease. The ReptiSun T5 10.0 HO, Arcadia T5 12% Desert, or Arcadia T5 14% Dragon are all acceptable choices, depending on where you set up your dragon's basking spot. Arcadia provides a guide as to where to place your UVB fixture in relation to your dragon's basking spot. UVB fixtures should be roughly as long as half your reptile's enclosure length. It is important to note that UVB cannot penetrate glass, so natural sunlight through a window will not be sufficient for a lizard to synthesize vitamin D3. Allowing safe outdoor time is also an excellent source of UVB and visible light. Dragons taken outdoors should be kept in an escape-proof and predator-proof, non-glass enclosure. Provide shade and basking spots so your dragon can regulate their temperature.

Sunlight is made of ultraviolet, near infrared (IR), mid IR, far IR, and visible light. It is our job as keepers to provide full spectrum lighting, which means as close to sunlight as possible. Unfortunately there is not one source for all of these components, so we must provide multiple types of lighting. For visible light, LED or halide bulbs should be provided.

UVB is NOT optional for lizards. Lack of proper UVB can lead to impaired skeletal, muscle, and immune function. Replace UVB bulbs every 6 months, as they can continue to give off light even when not producing UVB. Lights should be turned off at night to maintain normal day/night cycles. For this reason, red or black nightlights should not be used as they can disrupt normal day/night cycles.

Arcadia UVB guide:

<https://www.arcadiareptile.com/lighting/guide/>



BEARDED DRAGON

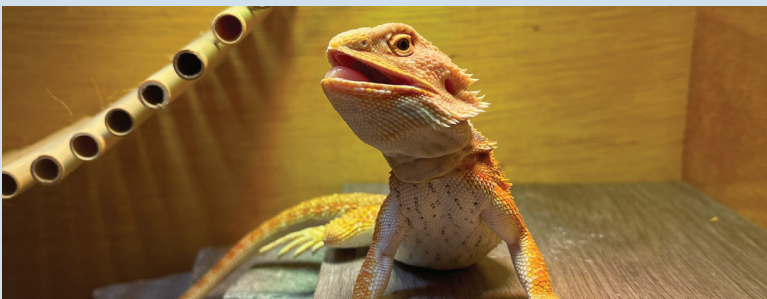
By Catherine Love, DVM

Updated 2023

HEAT

Unlike mammals, reptiles cannot internally regulate their temperature and rely on their environment to heat and cool themselves. Therefore, it is important that we provide captive reptiles with a temperature gradient so they can warm up or cool down as needed. Reptiles have three temperatures to measure: basking spot, warm ambient, and cool ambient. The basking spot is the hottest area in the enclosure where they bask, the warm ambient is the air temperature on the warm side of the enclosure, and the cool ambient is the air temperature on the cool side of the enclosure. Ambient temperatures are best measured with digital thermometers (one on the warm end and one on the cool end), as analog thermometers are often inaccurate. Basking temperatures can be measured with a digital infrared thermometer.

Bearded dragons need a basking spot of 105-115F, a warm ambient of 95F-100F, and a cool ambient of 75-80F. Any light emitting sources should be turned off at night and temperatures can drop to 65F. If needed, a non light emitting source like a ceramic heat emitter, radiant heat panel, or deep heat projector can be used to maintain temperature at night. Sunlight is made of UV, near IR, mid IR, far IR, and visible light. Flood tungsten-halogen bulbs are the most efficient at producing near IR, which is the most abundant IR in sunlight, and they also produce significant mid IR and some far IR. Far IR is the least abundant in sunlight, but is most often produced in large amounts by sources like ceramic heat emitters, heat pads, and radiant heat panels. Tungsten-halogen bulbs should be the flood type to ensure a wide enough basking site. These heat producing bulbs can be found as reptile specific bulbs or at hardware stores. Avoid hot rocks as these can easily burn reptiles.



HUMIDITY

Bearded dragons should have an ambient humidity of 30-60% measured by a digital hygrometer. A water dish and occasional heavy misting should be enough to provide adequate humidity. A dehumidifier may be needed to reduce humidity. Ceramic heat emitters also tend to dry out enclosures, but do not necessarily replicate the sun's light.

Wild dragons have access to and spend time in humid microclimates, such as burrows or clumps of grass. If natural substrate is being used and the dragon is able to burrow, this may be able to replicate the microclimates. If tile, paper towel, or any other kind of non-burrowing substrate is used, it may be beneficial to offer a humidity hide, which is a humid microclimate that is kept humid with moist (but not soaking wet) moss. Tupperware with a bearded dragon sized hole is a simple DIY humidity hide that can be used. This allows the dragon to enter a more humid climate at will.

FEEDING

In the wild, adult dragons eat 70-90% plant matter, juveniles (6-12 months) eat 40-60% plant matter, and hatchlings (up to 4-6 months) eat 30-50% plant matter. The remainder of the diet is animal protein, primarily insects and other invertebrates. In captivity, variety is important to avoid nutrient deficiencies and provide enrichment. Adults should be fed protein 2-3x/week, juveniles 1x/day, and hatchlings 2-3x/day. Overfeeding is a common problem in bearded dragons and can lead to fatty liver disease. Dragons can be fed the equivalent of 5-10 appropriately sized crickets/meal. For juveniles, food should be no larger than the width between their eyes. A salad should be offered daily. For adults, a salad includes 1 cup staple greens, 1/2 cup veggies/herbs, and 1 tbsp of fruit. Portions can be divided in half for hatchlings or 3/4 for juveniles. A multivitamin with vitamin A should be provided weekly. Remove all uneaten food to prevent spoilage, and to prevent feeder insects from snacking on your dragon.

BEARDED DRAGON

By Catherine Love, DVM

Updated 2023

WATER

Protein: Insects are naturally deficient in calcium and low in nutritional value. In order to make them nutritious for reptiles, all insects should be gutloaded (fed a highly nutritious meal 24-48 hours before feeding). Repashy BugBurger or Arcadia InsectFuel are good choices for feeding feeder insects. Insects should also be dusted with calcium powder 1-2x/week, or daily for hatchlings and juveniles. Calcium powders should be calcium carbonate based and should not have any phosphorus. If you are providing adequate UVB, calcium powder does not need to contain D3. Arcadia, Repashy, and ZooMed all have good products. Follow your brand's recommendations to avoid overdosing. Acceptable protein sources include: crickets, dubia roaches, hornworms, phoenix worms, silkworms, locusts, and occasional mealworms, wax worms, and superworms. Pinkie mice are acceptable as occasional treats for adults.

Staple greens: Dandelion greens, arugula, swiss chard, mustard greens, turnip greens, bok choy, endive, and beet tops. Many keepers choose to buy a spring mix of salad greens. Avoid mixes with a large amount of spinach as spinach contains oxalates that can disrupt calcium absorption.

Veggies/herbs: Asparagus, carrots, basil, parsley, cucumber, cilantro, squash, zucchini, bell pepper, and radish. Veggies should not be frozen as this can decrease the nutritional value. Ensure veggies are cut into bite sized pieces. Avoid onion, garlic, and rhubarb.

Fruits: Strawberries, watermelon, blueberries, apples with seeds removed, pineapple, grapes, raspberries, pears, honeydew. Avoid avocado.

There is debate amongst keepers about how often bearded dragons should have water available. It is a common misconception that having a water bowl in the enclosure will make the humidity too high. A single water bowl in a well ventilated enclosure with non-humidity holding substrate won't greatly impact the humidity. Another misconception is that bearded dragons "drink" through their cloaca to hydrate themselves. This is a myth; when soaked in water for 60 minutes with a contrast solution called iohexol, there was no evidence of uptake. As inhabitants of arid climates, many keepers often make the incorrect assumption that bearded dragons need to be kept in extremely dry conditions. However, wild dragons spend time in a higher humidity burrow or clumps of grass and are therefore exposed to variable levels of moisture, as well as rainfall in Australia's wet season. Given that dehydration is a major concern for captive reptiles, it is important to provide as many safe hydration options as possible. If the dragon is not stressed, soaking once or twice weekly can be done to encourage defecation and hydration (if the dragon drinks during the bath), but should not be necessary with proper diet and husbandry.

Bearded dragons should have fresh water available at all times in a dish large enough to soak in. Greens can also be soaked and misting can be done occasionally to help maintain hydration, since dragons may drink the droplets. The reason water should be available at all times is for a few reasons. First, soaking has a laxative effect. Constipation is a common issue in bearded dragons so offering the opportunity to soak at will can help them defecate normally. Given that they like to defecate in water, water dishes should be disinfected at least 1x/week and as needed if they defecate in it. Additionally, while wild dragons may get a large amount of their water from food or droplets, they are still capable of drinking from standing water. As much as we try to replicate their wild environment, it is impossible for us to be 100% perfect. Therefore, it is recommended to have water available at all times, since we may not be perfectly replicating wild conditions where dragons would obtain water from other sources. As long as water is kept clean and isn't too deep (no higher than the elbows), keeping water in the enclosure has no negative consequences for dragons.



BEARDED DRAGON

By Catherine Love, DVM

Updated 2023

SEXING

Dragons reach maturity at 8-12 months old. Males can be distinguished from females by their more prominent femoral pores and hemipenal bulge.

ZOONOSIS

Like other reptiles, bearded dragons can carry Salmonella. Always wash your hands after handling reptiles or items from their enclosure.

HEALTH

Bearded dragons tend to be hardy lizards but are prone to a number of diseases including nutritional-secondary hyperparathyroidism (metabolic bone disease) which is caused by insufficient calcium or vitamin D. Gout (uric acid crystal deposits in the joints or organs) is also quite common, as many bearded dragons end up with too much protein (i.e. insects) in their diet and not enough hydration. Dehydration can also contribute to shedding issues, kidney failure, and constipation. Female reptiles in general are also very prone to reproductive issues, which is still a very common cause of death for them. Bloating, increased restlessness, and digging behavior can be signs of reproductive behavior. Even females that have never been kept with a male may lay eggs, just like birds. Keeping bearded dragons at a healthy lean body condition, reducing high energy foods, maintaining appropriate calcium and vitamin D balances, and providing a dig box can help reduce the risk of reproductive issues. If egg development stagnates it can lead to severe illness or even death. Female lizards may need to be spayed if the eggs are not laid appropriately. Beardies should be examined every 6-12 months by your veterinarian.

Sources and Further Reading:

- Fan, M., Stuart-Fox, D., & Cadena, V. (2014). Cyclic colour change in the bearded dragon *Pogona vitticeps* under different photoperiods. *PloS one*, 9(10), e111504.
- Johnson, R., & Adwick, S. (2018). Central bearded dragons (*Pogona vitticeps*). *Companion Animal Care and Welfare: The UFAW Companion Animal Handbook*, 395-411.
- Raiti, Paul. "Husbandry, diseases, and veterinary care of the bearded dragon (*Pogona vitticeps*)."
Journal of Herpetological Medicine and Surgery 22.3 (2012): 117-131.
- Wright, Kevin. "Two common disorders of captive bearded dragons (*Pogona vitticeps*): nutritional secondary hyperparathyroidism and constipation."
Journal of Exotic Pet Medicine 17.4 (2008): 267-272.
- ARAV Companion Pet Reptile Series: Bearded Dragon
- <https://www.reptifiles.com/bearded-dragon-care-packet/>
- <https://azeah.com/lizards/bearded-dragon-nutrition>
- <https://www.herpvet.com.au/central-bearded-dragon-care-sheet/>
- <https://www.unusualpetvets.com.au/wp-content/uploads/2018/05/Bearded-Dragon-Care-Sheet.pdf>
- <http://www.exoticpetvet.com/bearded-dragon-care.html>
- <http://www.anapsid.org/bearded.html>
- Mader's Reptile and Amphibian Medicine and Surgery
- The Arcadia Guide to Reptile and Amphibian Nutrition
- Facebook: How Not to Slay the Dragon (*Pogona vitticeps*)
- Facebook: Advancing Herpetological Husbandry
- Facebook: Beardievet