

Reptile Nutrition



Common Chronic Nutritional Diseases:

- Nutritional Secondary Hyperparathyroidism (NSHS)
- Hepatic Lipidosis
- Protein Deficiency
- Hypovitaminosis A
- Hypervitaminosis A
- Pyramidal Shell Growth
- Renal Disease
- Urocystoliths
- Thiamine Deficiency
- Vitamin E/Selenium Deficiency
- Steatitis
- Corneal Lipidosis
- Loose Stools
- Starvation

Introduction

Nutritional deficiencies are the leading cause of disease in reptiles.

In general, reptiles can be categorized as insectivores, carnivores, herbivores, and omnivores. However, many reptiles have very specialized dietary needs and the nutritional requirements for adults may differ significantly from the juvenile. In addition, the diet consumed in the wild is often difficult to replicate in captivity because it can vary significantly due to seasonal changes, geographical location, stage of growth of the plant or prey, and availability. For example, store bought vegetables and insects are not the same as those found in nature. The insect's developmental stage is very important because their nutritional status changes as

they go through their various life stages. The same is true for plants.

For dogs and cats, the AAFCO (Association of American Feed Control Officials) oversee nutritional guidelines and the FDA/CVM (Food and Drug Administration/Center for Veterinary Medicine) make sure the food is **safe** and labels are **accurate**. Unfortunately, there are no regulatory agencies that oversee the production and advertising claims of reptile diets and supplements. It is up to both veterinarians and owners to do extensive research and learn to read the food labels. Your research needs to include as much **current scientific** data as is available. Unfortunately, many of the older studies are **outdated** due to current

“Nutritional deficiencies are the leading cause of disease in reptiles”

knowledge we have today that was unavailable when the study was completed. There are nutritional studies available for some reptiles, but for many reptile species, we are still learning their nutritional requirements. These studies are ongoing and new information is being discovered all the time. As you can see, reptile nutrition is a complex science.

Complete Manufactured Diets

“Not all diets are created equal. In order to provide the best nutrition to your reptile, learning to read food labels is essential.”

Most pet owners prefer complete manufactured diets because it is easy to feed. Consumers assume that complete manufactured diets contain all the nutrients that the animal needs.

Not all diets are created equal. Owners need to research these manufactures. Some diets are from feed manufactures that have PhD nutritionists and/or veterinarians on staff to provide professional input,

while others are from pet suppliers with little expertise in nutrition. Unfortunately, data and research to formulate nutritionally complete reptile diets are not currently available for all species.

Consumers have to do their research because there are no regulatory agencies that oversee the production and advertising claims of reptile diets and supplements. You and your veterinarian

should work together to determine the best diet for your reptile.



Food Labels

Reading food labels can be challenging. The more nutritional information provided the better. If the ingredients are listed without a **guaranteed analysis**, then you should be cautious. In order to compare diets correctly, the nutrient levels should be provided as **dry matter basis (DMB)** not *as fed basis (AF)*. Since the water content of food varies, AF levels are not good for comparing ingredients. To accurately compare diets, you need to compare on a DMB. You need to look at protein, fat, fiber, moisture, ash, and carbohydrate.

Metabolized energy (ME) is another way to compare foods (kcal ME/cup). In general, juveniles require higher ME than adults. Carnivores, generally, also require a higher ME.

A protein to energy ratio (P:E) can be another helpful reference. In general, the P:E ratio changes throughout the life of the animal. The growth phase, reproductive status and activity all require different P:E ratios. The consumption of excess calories resulting in rapid maximal growth is not compatible with optimal skeletal development. Muscle

growth is faster than bone growth. This may result in skeletal deformities in juvenile chelonians and power-fed snakes. Also, physiologic excess of protein will be stored as fats.

Protein is the most expensive component of the diet. Many companies will use less expensive protein sources, such as plant proteins, with small amounts of mammalian or fish proteins. The digestibility of plant proteins is lower in some species, such as carnivores.



Supplements

As a general recommendation, a **multivitamin** should be supplemented *1-2 times monthly*, if the reptile is not eating a high quality commercial pellet.

Multivitamins can be broken down to those with calcium or those without calcium. A true multivitamin should contain all the vitamins (A, B, C, D, E, and K) and trace minerals. Also, the amount of calcium in a multivitamin is deficient and will lead to NSHP (nutritional secondary hyperparathyroidism or metabolic bone disease) if used on a daily basis.

Calcium is a very important nutrient in reptile diets. Healthy calcium to phosphorus (C:P) ratios for most vertebrates is 1-2 parts calcium to 1 part phosphorus (1-2:1). However, it may be higher in juveniles. For some juvenile species, the C:P ratio requirement can be as high as 6-7:1 which then drops to 1-2:1 in the adult. Calcium should be provided on a *daily* basis to all growing reptiles not consuming whole vertebrates regularly. Most calcium salts are better

absorbed if given *with* food and help to competitively inhibit phosphorus absorption. Calcium supplements should be given *independent* of multivitamins and contain *little to no* phosphorus. The type of calcium used is also important since different calcium salts have different bioavailability. Calcium carbonate is able to be absorbed and utilized better than the any other calcium salts with calcium citrate coming in second. Finally, how well the calcium “sticks” to the insect is important. Finer particles appear to adhere better than courser ones. Be aware that heavily dusting leafy greens may make them unpalatable to the reptile.

Some multivitamin supplements provide no vitamin A. Instead it is listed as *B*-carotene which could be detrimental for insectivores. *Insectivores* need vitamin A in their diet because many cannot convert *B*-carotene precursors to vitamin A. All *herbivores* appear to be capable of vitamin A synthesis. Vitamin A

deficiency is uncommon in *carnivores* because the liver in whole animal prey is an excellent source of vitamin A. The ratio of A:D:E should be about 100:10:1.

Essential amino acids
supplementation is not
necessary if insects, whole
animals, and nutritional
complete commercial diets
(pelleted) are fed.

Reptiles are thought to use **vitamin D3** (cholecalciferol) not D2 (ergocalciferol). Vitamin D is a fat soluble vitamin and excess will be stored in fat. Adequate UVB light exposure reduces the need for dietary supplement of vitamin D3 in calcium supplements, especially if multivitamins or fortified foods containing vitamin D3 are given regularly. The general recommendation is vitamin D3 supplementation is not necessary if the reptile has access to natural sunlight.

“Calcium should be supplemented on a DAILY basis. The calcium salt with the best bioavailability is calcium carbonate.”

Mazuri® Hi Calcium Gut Loading Diet

Approximate Nutrient Composition Ca:P 13:1

NUTRIENTS	
Protein, %	18
Aspartic, %	1.0
Cystine, %	0.14
Methionine, %	0.40
Isoleucine, %	0.80
Leucine, %	1.10
Lysine, %	1.0
Methionine, %	0.10
Phenylalanine, %	0.14
Serine, %	0.10
Threonine, %	0.10
Tryptophan, %	0.02
Valine, %	0.80
Net Fiber content, %	9.7
Gross Energy, %	8.1
Neutral Detergent Fiber, %	11
Acid Detergent Fiber, %	8.0
MINERALS	
Asb, %	0.1
Calcium, %	1.4
Magnesium, %	0.04
Phosphorus (elemental), %	0.10
Potassium, %	0.04
Sodium, %	0.04
Chlorine, %	0.04
Iron, ppm	400
Zinc, ppm	40
Manganese, ppm	40
Copper, ppm	40
Selenium, ppm	0.04
Antimony (total), ppm	0.1
VITAMINS	
Thiamine, ppm	1.0
Riboflavin, ppm	0.1
Niacin, ppm	1.0
Acetaminophen, ppm	0.04
Choline, ppm	0.04
Vit. E, ppm	0.1
Provitamin, ppm	0.1
Retinol, ppm	0.04
Vitamin K ₁ , ppm	0.04
Vitamin K ₂ (Menaquinone), ppm	0.04
Vitamin B ₁₂ , ppm	0.04
Vitamin C, ppm	0.04
Vitamin D ₃ , ppm	0.04
Vitamin E, ppm	0.04
Vitamin K ₁ , ppm	0.04

Water

"Water sources vary between species. Many species do not drink water from open sources (i.e. a water bowl). They drink from water droplets on leaves and other surfaces. Provide a mister or drip system. Others prefer to soak so they need a large water dish that they can sit in comfortably"

Water is the most important nutrient for every living being. Three sources of water are available to animals: Dietary Water (in food), Metabolic Water (formed from cellular metabolism), and Environmental Water

Many of the adaptations we see in various species have developed for the purpose of obtaining, conserving, or eliminating water.

While the need for water is consistent, species vary in the means of obtaining water. Some desert species have developed means of obtaining water metabolically through the processing of the food. Others recycle water very effectively. These adaptations allow certain reptiles to survive in very barren, dry environments.

Unfortunately, it also leads to reptile owners testing the limits with their animals. For example, while uromastix lizards can survive without water under the right conditions, they will do better when they have regular access to water.

The form in which water is provided makes a difference as well. Some species rarely, if ever, drink from an open water source, i.e. water bowls. They lap at droplets of water from plants or other surfaces, or even from their own bodies. In addition to providing free-standing water (bowl), water should also be provided by a misting bottle, a drip system, or other means for species that do not drink from open water containers. The water dish should be easy to access and

easy to exit as well, especially for turtles and tortoises. Some species prefer to soak in water when they drink so the container should be large enough for the reptile to sit in comfortably. The area around the water dish should not be soaking wet all the time, so provide good drainage in this area as well.

Bacteria thrive in water. Changing the water frequently (*at least* daily) is essential.



Our Mission

All Creatures Animal Hospital is dedicated to providing progressive medicine in a caring environment for pets of all species. Through preventative medicine, client education, professional development of our staff, and advanced medical and surgical techniques, we hope to foster a strong and lasting bond with clients and their pets.

All Creatures Animal Hospital

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