

Diseases of Leopard Geckos with Special Emphasis on Cryptosporidiosis

Natural History

Leopard geckos belong to the gecko family, Gekkonidae, which inhabit all the continents except Antarctica. They belong to the subfamily Eublepharidae that consists of terrestrial geckos characterized by movable eyelids. This subfamily also lacks the adhesive sub-digital lamellae on their digits prohibiting them from climbing on smooth vertical surfaces. They do possess a small claw on each digit which assists in digging and climbing around rocks. The leopard geckos inhabit the arid to semi-arid areas of Afghanistan, Pakistan, and India. They are often found in rocky habitats with hardened clay and sandy coverings to allow for burrows to be created in the rock crevices. Being a nocturnal species they sleep during the day in humid burrows and come out to hunt insect prey at night.

Husbandry

Leopard geckos are easy to house in general with simple accommodations. Juvenile geckos and single adults may be housed in 10 gallon (38 L) or 20 inch (51 cm) long aquaria. When keeping a breeding pair, a 20 gallon (75 L) or 30 inch (76 cm) long aquarium works well with larger sizes of enclosures directly proportional to larger breeding group sizes. The decorations may be very spartan for breeding setups with paper towels and plastic bowls. For display centerpieces in homes, the enclosure may be designed with rock formations, sand/soil, and small plants.

Leopard geckos are nocturnal and do not require the intense ultraviolet radiation as other heliotropic species. A full spectrum bulb of moderate wattage should be used to provide natural daylight cycles and to "show off" naturalistic enclosures. This bulb may provide some heat in conjunction with an under-tank heating pad to provide a daytime temperature of 75° to 85°F (24° to 29°C) with a focal heat region of 85° to 90°F (29° to 32°C). Nighttime temperatures may lower slightly by 5° to 10°F (< 5°C). Humidity is generally low but geckos do require some periodic humidity to assist in shedding. Humidity can be provided through small plastic tubs with access and filled with moist substrate, moss, coir, etc.

These terrestrial geckos are pure insectivores, consuming any of the commercial prey insects of proper size in the pet market such as crickets, mealworms, etc. These insect food items need to be "dusted" with minerals/vitamins or fed with supplements (i.e., Gut-Loaded) to fortify the nutritional contents of the insect's gastrointestinal tract. Breeders will often leave out a small dish of a calcium powder with vitamin D₃ supplement to allow the geckos (especially cycling females) to naturally consume their desired dietary intake. A small shallow dish of fresh water should be provided and changed daily. A small shelter should be provided to provide a visual barrier (i.e., "hide box").

Leopard geckos become sexually mature at 3 to 5 months for males and 9 to 10 months for females depending on juvenile growth rates and time of year hatched. They do not fully mature in size and reproductive capacity reaches at about 18 months. Male geckos can be differentiated from females by more prominent preanal pores, longer length, increased weight, and a more slender build. Breeders have found that one male gecko can be combined with 4 to 5 female geckos for optimal egg

production. Female geckos may lay one to two eggs several times during the breeding season from January to September.

Current Topics of Medical Conditions

Shedding Problems

Although leopard geckos come from a mostly arid environment, they do require some moisture to allow for proper shedding. Their natural burrows in the rock crevasses are often relatively humid compared to their surroundings. In captivity, a small plastic enclosure with a moistened substrate such as moss, coir, etc should be provided to allow for natural selection of humidity levels within the enclosure during times of normal shedding (ecdysis).

Often leopard geckos will shed 95% of their surface area. The areas that do not seem to fully shed routinely are the digits. Retained skin layers on the distal digits over time will constrict down and accumulate over time. This will eventually cause necrosis and sloughing of the distal claw and digit. Bacterial infection of the remaining digit or foot is possible. High detail dental or digital radiographs may determine if any significant lesions or osteomyelitis is present. Treatment generally involves soaking the digits in isothermal water to moisten and loosen the skin. The gecko is then manually restrained or sedated (in severe cases) to "unwrap" the skin or remove the digits if the damage is too severe.

"Metabolic Bone Disease"

Leopard geckos are nocturnal; therefore, they do not need to bask in the sun for much of the daylight to metabolize vitamin D. Instead, these geckos must consume adequate amounts of vitamin D, as well as calcium, from their diets. They have been known to bask sporadically in the wild or in naturalistic enclosures. They will often consume their substrate to obtain enough calcium in their deficient diet which can lead to impactions described below. Insect diets are deficient in calcium and have an inverse calcium:phosphorus ratio (i.e., less than 1:1). Insects must be "gut loaded" or dusted with an appropriate calcium and vitamin mix. Alternatively or additionally, a small shallow dish of calcium and vitamin mix may be added to the gecko's enclosure to allow for self-feeding of the supplement. Many breeders utilize this approach very successfully to maintain colonies in the hundreds of animals.

A leopard gecko with "metabolic bone disease" (MBD) from a total or relative calcium deficiency is the result of nutritional secondary hyperparathyroidism (NSHP). The most common clinical presentation is softened or "rubbery" bones where calcium has been removed in attempt to maintain blood concentrations. The dense bones are replaced with a fibrocartilage matrix in attempt to provide some stability. Unfortunately, the bone becomes distorted and decreases in functionality, especially the mandible which begins to restrict food intact through mechanical malfunction and pain from bending during mastication.

Therapy of NSHP revolves around basic nursing care of caloric supplementation and water intake. Many of these patients are anorexic and require syringe or tube feeding to maintain caloric intake. Artificial diets may be made from insect puree ("cricket and mealworm shake"), chicken baby food mixed 1:1 with liquid replacement diet (Ensure®; Abbott Laboratories; Abbott Park, IL), powdered

replacement diet (Carnivore Care; Oxbow Enterprises; Murdock, NE), or a blended commercial insectivore diet (Mazuri® Insectivore Diet; PMI Nutrition International; St Louis, MO). Calcium supplementation is provided through calcium gluconate injections initially to oral calcium supplementation with calcium glubionate.

Sand Impaction

Leopard geckos may be housed on several substrates successfully, but keepers of these geckos should be very diligent in observation and food presentation for those kept on sand or sand alternative. Food items should be offered in shallow dishes to prevent accidental ingestion of sand during food consumption. Some geckos have been known to inappropriately ingest sand as a food substrate (pica). Keepers should monitor the fecal pellets for increased sand by mixing the pellets in water in test tube (or similar). This technique parallels methods used with horses for the detection of sand ingestion. Careful observation of the food intake to prevent sand ingestion or early signs of anorexia or abdominal distention may prevent a full impaction.¹

Impacted leopard geckos may present with anorexia, decrease fecal output, and/or abdominal distention. Radiographs will often reveal radiodense material in the intestines. Abdominal transillumination may also reveal dense material in the intestinal tract. If instituted early in the disease process, oral fluid therapy in combination with gastrointestinal prokinetics (i.e., metoclopramide, cisapride, fiber, etc) may stimulate sand passage. If the sand has formed a full foreign body impaction, then surgical management of laparotomy with enterotomy to remove the contents should be considered.¹