



Care of Sugar Gliders

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The sugar glider is a small, nocturnal, arboreal marsupial native to New Guinea and the southern and eastern coasts of Australia. They inhabit open forest areas, in the tropical or coastal forests. They are very social animals, living in colonies of six to ten animals. Dominant males mark the territory and group members with scent gland secretions. The group nests communally in leaf-lined tree holes. During extreme cold periods or food scarcity, sugar gliders conserve energy by going into a semi-hibernation state (torpor) for periods of up to 16 hours per day.

Physical Characteristics

Sugar gliders have soft, velvety fur which is gray dorsally with a central black stripe and cream colored underside. Similar to the American flying squirrel, sugar gliders possess a patagium (gliding membrane) that stretches between their front and hind legs. Being marsupials, the females raise their young in a pouch. Mature sugar gliders weigh 90 to 120 grams, with males typically larger than females. They are about five inches long from their nose to the base of their tail. The tail adds another six inches to their length, which is used as a rudder to navigate as they glide. Gliding distances are reported up to 150 feet. Being a nocturnal prey species, their eyes are large, protruding and widely spaced. Sugar gliders have four toes on their hind feet, with an opposable first digit and partial fusion of the second and third digit. Males possess well-developed scent glands on their forehead (frontal) and upper chest (throat), which appear as bald patches.

Husbandry

Sugar gliders make good pets if given sufficient socialization and ample space. When hand reared, they adapt well to captivity and develop a strong bond with their human companions. These are time consuming pets, with recommended socialization periods of at least two hours a day. Due to their nocturnal nature, the best time for handling is in the evening. Advantages of these pets include their small size, playfulness and intelligence. Sugar gliders have longer life spans than other comparably sized pets,

living up to ten to twelve years in captivity. Disadvantages include the nocturnal nature, housing requirements, dietary needs and musky odor.

A sugar glider cage should be as large as possible because of their active nature. These animals need space to climb, run and jump. Minimum cage size is 20" x 20" x 36". Cages should be made of wire for good ventilation, with wire spacing no more than 1" by 0.5" wide. Sugar gliders tolerate temperatures between 65°F to 90°F, with an ideal range of 75°F to 80°F. The cage must have designated areas for food, water, shelter, and exercise. Several food and water dishes should be placed in various locations throughout the cage. A nest box or sleeping pouch positioned high in the cage gives the sugar glider a place to sleep during the day. Bedding for the nest site is not necessary, but hardwood shavings, recycled paper substrate or shredded paper can be provided. Branches, perches and shelves can be placed at various levels of the cage to allow for the natural climbing behaviors. Sugar gliders enjoy playing with bird toys, such as swings and chew toys. Plastic wheels without open rungs are used for exercise as with hamsters. A variety of objects throughout the cage provides stimulation and entertainment for the pet.

Nutrition

Sugar gliders have broad dietary needs. The diet of the wild sugar glider includes sap and gum from eucalyptus and acacia trees, nectar and pollen, manna and honeydew, and a wide variety of insects and arachnids. Their diet varies with the season. These animals are primarily insectivorous during the spring and summer months. During the winter months, the sugar glider feeds on gum from the eucalyptus and acacia trees, as well as sap and sugar excretions from the trees and sap-sucking insects. Although these animals readily accept fruit, nuts and grains, these are not a substantial part of their natural diet. Contrary to the nutritional needs observed in the wild, much of the information found in lay publications lists fruit and vegetables as a major portion of the captive diet.

Several components make up the recommended sugar glider diet. The captive diet should include nectar, insects, other protein sources, and limited fruit and vegetables. Protein is a critical nutritional factor in sugar gliders. Various protein sources include insects (mealworms and crickets), eggs, newborn mice, lean meat and commercial protein sources (insectivore diets, monkey chow). Another natural dietary component is sap and nectar, which provides the necessary carbohydrates. Sources include fresh nectar, honey, and artificial nectar products. Examples of commercial products include prepared lory diets and Gliderade® (Avico). Commercial sugar glider and insectivore diets are available and should be included as part of the diet. Leafy green vegetables

can be provided as a source of fiber and certain vitamins. Sugar gliders accept a wide variety of other foods, including fruit, vegetables, nuts and seeds (sunflower and pumpkin). Fruit juices and strained baby food can be offered if free of preservatives. Since these foods are not a significant component of the natural diet, they should constitute less than 10% of the diet. A broad-spectrum vitamin and mineral supplement with a good calcium supply is lightly sprinkled on the food daily.

A simplified diet for captive sugar gliders has been proposed. The diet consists of 50% insectivore/carnivore diet and 50% Leadbeater's mixture, with a small amount of other foods as treats. Various insectivore/carnivore diets are marketed and the choice depends on reliability of the company, availability to the owner and acceptance by the pet. The Leadbeater's mixture consists of 150 ml water, 150 ml honey, 1 shelled hard-boiled egg, 25 gm high protein baby cereal and 1 tsp vitamin and mineral mixture. This mixture is kept refrigerated until served. The mixture can be frozen for later use, with refrigerated portions discarded after about 3 days. Acceptable treat food can include lean meats, diced fruit, bee pollen, and gut-loaded insects. Treats should constitute less than 5% of this diet.

Reproduction

Sugar gliders have several reproductive cycles during the breeding season, typically between June and November in Australia. A dominant male will breed with all mature females in the colony. Most young are born in the spring, when insects are plentiful. Litter size is usually two (81%), but only one is born rest of the time (19%). Two litters are common in a single breeding season. The estrous cycle is 29 days, and gestation is only 15 to 17 days. Young weighs only 0.2 grams at birth when they migrate to the pouch. They remain in the pouch for 70 to 74 days. As they outgrow the pouch, they are left in the nest until they are weaned at 110 to 120 days of age. The young remain with the colony until they are forcibly dispersed at 7 to 10 months of age.

Medical Conditions

Malnutrition

In captivity, sugar gliders commonly suffer from malnutrition as a result of the misinformation regarding their dietary requirements. Common diet-related conditions in captive sugar gliders include hypocalcemia, hypoproteinemia, and anemia. The hypocalcemia is primarily due to an imbalance of dietary calcium, phosphorus, and vitamin D. Lack of dietary protein is a cause of anemia and hypoproteinemia in these animals. With chronic malnutrition, liver and kidney values are abnormal as these

organ systems become affected. Malnourished sugar gliders present weak, lethargic, and debilitated. These animals are usually thin and dehydrated. Pale mucus membranes, edema and bruising may be present with anemic and hypoproteinemic patients. Secondary infections are common in these debilitated animals. Treatment involves general supportive care along with correction of the underlying dietary problems.

Obesity occurs in captive sugar gliders fed a diet too high in fat or protein. Lack of exercise also contributes to the problem. Obesity can lead to heart and liver disease as seen in other species. Fatty deposits can form in the eyes of juvenile sugar gliders when the mother is fed a diet too high in fat. These appear as small white spots within the eyes and can affect sight. Treatment of obesity includes dietary modification and increased exercise.

Nutritional Osteodystrophy

Nutritional osteodystrophy is also known as metabolic bone disease or nutritional secondary hyperparathyroidism. It is a common cause of hind limb paresis to paralysis in pet sugar gliders. The condition resembles the syndrome seen in calcium-deficient captive reptiles. The clinical presentation is sudden onset of hind limb paresis. If severely hypocalcemic, seizures and pathologic fractures can develop. Spinal trauma and general malnutrition are differential diagnoses. Radiographs may reveal long bone, pelvic and vertebral osteopenia. This occurs most often in sugar gliders fed a calcium-deficient diet comprised of 75% fruit and 25% muscle meat. Patients identified in the early stages may respond to cage rest, calcium and vitamin D₃ supplementation, and dietary correction. Diets should contain about 1% calcium, 0.5% phosphorus, and 1,500 IU/kg vitamin D on a dry weight basis. Insects should be gut-loaded with calcium before being fed to sugar gliders.

Stress Related Disorders

Stress in sugar gliders can present in numerous ways. Self-mutilation is common of the tail, limbs, scrotum and penis in the stressed and frustrated sugar glider. Castration is recommended for pubescent males that mutilate their penises or scrotums, since sexual frustration may be a factor. Stressed sugar gliders can also present with increased appetite and thirst, ingestion of foreign material, and pacing. Some patients simply present with alopecia, presumably from increased adrenal activity caused by stress. Providing proper nutrition and hygiene, normal social grouping, appropriate nesting areas and cage accessories, and protection from potential predatory species helps to reduce the stress in captive sugar gliders.

Infectious Disease

Infectious diseases are not well documented in captive sugar gliders, but they are presumed susceptible to the same pathogens as other marsupials in their family. Sugar gliders have died from *Pasteurella multocida*, spread by rabbits kept in the same area. The disease is characterized by generalized abscessation of various organs and subcutaneous areas and sudden death. *Clostridium piliforme*, giardiasis, and cryptosporidiosis have been diagnosed in captive sugar gliders. Marsupials are susceptible to *Toxoplasma gondii*, which causes neurologic signs and sudden death.

Parasites

Diseases caused by parasitic infestation have not been specifically reported in captive sugar gliders. Parasites are most likely found in wild sugar gliders or captive gliders kept outdoors. Various nematodes, trematodes, tapeworms, mites, lice, and fleas are all potential parasites of sugar gliders. Some parasites identified in sugar gliders include trematodes in the liver and nematodes from the gut. Ectoparasitic mites recovered from sugar gliders include Trombiculid mites, Astigmatid mites and Atopomelid mites.

Neoplasia

Lymphoid neoplasia is a common neoplasia encountered in captive gliders. In one report, 3 of 14 captive squirrel gliders died with neoplasia, including one malignant lymphoma of the spleen, liver and kidney, one basal cell tumor of the pouch, and one bronchogenic carcinoma. Reported deaths in the greater glider due to neoplasia include chondrosarcoma in the jaw and malignant lymphoma in the lymph nodes and spleen. Cutaneous lymphosarcoma has been reported in a sugar glider.

Traumatic Injuries

Trauma is a common presentation in captive sugar gliders. Bite wounds from pet dogs, cats, and ferrets are potentially fatal to these little animals. These bite wounds are not only deadly from the physical trauma itself, but also the potential infection acquired at the wound. Sugar gliders are also injured by household hazards, such as falling into toilet bowls, chewing on electrical cords, being shut in a door or window, and stepped on by family members. Common injuries include cuts, punctures and fractures. Eye injuries are common in sugar gliders due to their slightly protruding eyes. Corneal scratches with ulceration and conjunctivitis are most common.