

# Sugar Gliders

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**Sugar gliders have become popular pocket pets particularly in the United States, Canada and Japan. They are also a popular small marsupial in zoo collections throughout the world. In zoo collections they are generally hardy, presenting to the veterinarian mainly with issues of periodontal disease or traumatic injuries. Pet sugar gliders may present with more veterinary problems particularly associated with inappropriate housing and diet. This article summarizes the husbandry and veterinary care of sugar gliders, with an emphasis on providing the specific needs for which the animal is adapted in the wild.**

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Sugar gliders (Order: Marsupialia; family: Phalangeridae; species: *Petaurus breviceps*) are small arboreal marsupials that live in colonies of up to 12 animals with a dominant male. They are omnivorous, feeding on varying proportions of gum, sap and insects depending on the season. They have gray fur with a dorsal black body stripe, a black tail often with a white tip, and a pale cream underbelly. In the wild, males generally weigh 115 to 160 g and females weigh 95 to 135 g. There are a number of subspecies that vary in size, with tropical species from Papua and New Guinea being the smallest.

## Behavior

Wild sugar gliders are generally aggressive. They are equipped with long sharp lower incisors that are adapted to pierce the bark of trees and are capable of inflicting a painful bite. Because of their size this cannot be considered dangerous. An angry sugar glider makes a noise disturbingly like a mini chain saw. They are ter-

ritorial and can cause serious, even fatal, injuries to each other if care is not taken with introductions. However, when handled gently from an early age, sugar gliders can become gentle and entertaining pets (see Fig 1).

## Diet

Wild sugar gliders feed on plant exudates, mainly sap and gum, as well as insects.<sup>1</sup> Live insect food is the preferred protein source for captive gliders, but this can be supplemented with a commercial small omnivore or insectivore mix or dry cat food. The tree sap can be supplied via maple syrup (the sap of the Maple tree) which has a substantial mix of minerals compared with honey. The commercially available syrup should be diluted 50:50 with water, offered in a sipper and made fresh daily. This mixture ferments in hot weather and may need to be replaced twice daily in hot climates.

Although nectar is not a major component of the wild diet, it is nutritionally similar to sap. A simple nectar mix can be made from 1.5 cups brown sugar, 0.5 cup glucose made up to 2 liters with warm water. A simple dry nectar mix can be made from 1 cup of rolled oats, ¼ cup of wheat germ, ¼ cup brown sugar, 1 tablespoon glucose powder, 1 tablespoon of raisins.



**Figure 1.** A recently weaned sugar glider in a zoo collection which has been habituated to handling.

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**Figure 2.** Tartar at the base of the lower incisors of a captive sugar glider.

Gum Arabic, which can sometimes be obtained from pharmacies, is gum derived commercially from an African *Acacia* species and provides a suitable approximation of this major component of the natural diet. The sugar gliders enlarged caecum is adapted to facilitate microbial fermentation of the complex polysaccharides obtained from acacia gum.<sup>1</sup>

Food for adults should be limited to 15 to 20% of body weight daily as obesity is common in pet sugar gliders.

Treat foods include a range of fruits and nuts but these should never exceed 15% of the diet (eg, apple, nectarine, melons, grapes, figs, sweet corn, sweet potato, beans, pumpkin, sprouts, lettuce, broccoli, parsley<sup>2</sup>). Acacia or eucalypt



**Figure 3.** Chemical restraint of a Leadbeaters possum with isoflurane via mask and T-piece. Until induction is achieved, the animal is restrained in a bag, with its face exposed for application of the mask. This mask is made from a plastic bottle with surgical glove taped over the opening. A nose sized hole is cut in the glove.



**Figure 4.** Whole body radiographs of a sugar glider, ventrodorsal and lateral views.

**Table 1.** Important Physiological Data for the Sugar Glider *Petaurus breviceps*

Longevity <sup>3</sup>	9–12 years
Adult male body weight <sup>3</sup>	115–160 g
Adult female body weight <sup>3</sup>	95–135 g
Respiratory rate <sup>3</sup>	16–40/min
Heart rate <sup>3</sup>	200–300/min
Body temperature <sup>3</sup>	36.3°C
Thermonutral zone <sup>4</sup>	27–31°C
Food consumption <sup>5</sup>	15–20% BWt
Dentition <sup>6</sup>	Diprotodont
Dental Formula (ICPM) <sup>6</sup>	3 1 3 4 1 0 4 4
Puberty <sup>7</sup>	7–10 months
Estrus cycle <sup>7</sup>	29 days
Gestation period <sup>7</sup>	15–17 days
Litter size <sup>7</sup>	2 (81%)
Birth weight <sup>7</sup>	0.2 g
Pouch emergence <sup>7</sup>	70–74 days
Weaning <sup>7</sup>	110–120 days

branches provide suitable behavioral enrichment. Holes can be drilled in branches and filled with the gum mixture to stimulate natural feeding behavior. The provision of some abrasive components in the diet is necessary to avoid tartar build up (see Fig 2).

### Housing

I personally believe that keeping sugar gliders in anything smaller than an aviary of at least 2 meters × 2 meters × 2 meters is inappropriate. In

the wild this species spends most of the night scampering along branches and tree trunks and gliding up to 50 meters between tall trees. Mesh size should be 1.0 cm x 2.5 cm. Depending on the location it is important to consider excluding predator access (cats, snakes, owls). Within the aviary they require a nest box that simulates their tree hollow. A wooden cylinder with a narrow slit opening will give them a nice sense of security. There must be a hinged door for daily checking or capture, and a removable base for cleaning. The aviary should be furnished with vertical and horizontal branches. Sugar gliders will feel safest in an elevated position, and they will feel vulnerable on the ground. For this reason, feeding stations and sleeping quarters should be elevated within the cage.

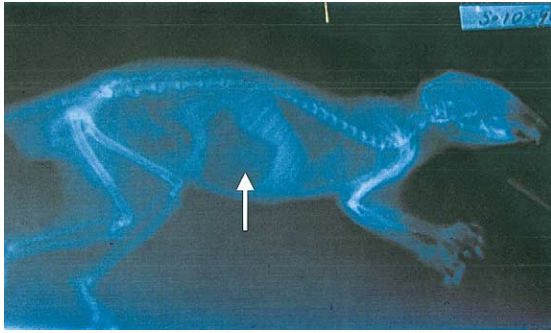
When kept singly, pet sugar gliders are often kept in small bird cages, with a suspended pouch provided as sleeping quarters. This may be satisfactory if the animal is given regular access to branches for exercise outside the cage, preferably under supervision.

### Restraint

Tame sugar gliders can be examined superficially with minimal restraint. For more invasive veterinary procedures, the sugar glider should be restrained with one hand holding the base of the neck controlling movement of the head, and the other at the base of the tail. For anything but very

**Table 2.** Common Clinical Conditions of Sugar Gliders

<i>Condition</i>	<i>Basic Approach</i>
Weight loss and inappetance	Full clinical examination under isoflurane GA, house alone to monitor intake
Obesity	House alone to control intake
Periodontal disease	Dental scaling and improve diet
Fractured lower incisors	Teeth are too small for root canal fillings, so monitor regularly for apical infections
Traumatic toe injuries	Evaluate under isoflurane GA, amputate exposed bone, dressings poorly tolerated
Ectoparasitism	Treat all gliders plus nest with Ivermec 0.2 mg/kg S/C and Carbaryl powder in nest
Hair loss at base of tail and/or forehead	May be associated with increased territorial behavior associated with breeding or introductions
Hindlimb paresis/paralysis	Usually associated with calcium deficient fruit dominated diet and osteoporosis of the vertebral column Radiographs and diet history. Treat with calcium and cage rest
Lymphoma	These are the most common neoplasms in possums and gliders
Corneal ulceration	Isoflurane GA and tarsorrhaphy



**Figure 5.** A radiograph of a Leadbeaters possum (a nongliding version of a sugar glider) with a gastric trichobezoar (arrow).

short procedures, chemical restraint is recommended. The anesthetic of choice is isoflurane administered by mask and T-piece (see Fig 3).

### Clinical Examination

Thorough clinical examination generally requires anesthesia. The following elements must be included in the examination:

- a systematic external examination
- measurement of rectal temperature (direct the thermometer dorsally within the cloaca), heart rate and respiratory rate,
- abdominal palpation
- pouch or scrotal examination
- examination of the oral cavity
- Important physiological data and common clinical conditions are given in Tables 1 and 2. Whole body radiographs may be helpful in clinical evaluation (see Figs 4 and 5). Radio-

graphs are usually required to detect changes consistent with pneumonia.

### Conclusion

Sugar gliders can be readily maintained in captivity provided that consideration is given to how they live in the wild. They require an omnivorous diet, exercise, protection from predators, and secure shelter. The captive diet should comprise 3 major components that nutritionally approximate sap, gum, and insects. They are social and prefer to live in colonies with a dominant male, but they can be maintained singly or in pairs if they receive enough of the right sort of attention. If their basic needs are met they are generally very hardy.

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