

Husbandry Protocol for Golden Lion Tamarins (*Leontopithecus rosalia rosalia*)

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Food and Water

Lion tamarins are primarily omnivorous. In the past, many captive animals suffered from protein and vitamin D₃ deficiencies since captive diets were heavily biased towards fruit. In recent years more balanced diets have been achieved. Both zoos and laboratories, however, usually supplement these diets since the actual requirements of the species are not known. Vitamin D₃ supplementation is required since callitrichids cannot synthesize this in the absence of sunlight (most marmoset diet now include Vitamin D₃ supplements).

A. Food – Adults: Animals should be fed twice a day. The morning feeding (8:00 a.m. to 9:00 a.m.) should consist of a prepared nutritionally complete diet; commercial marmoset diet alone, e.g. Science Diet for Marmosets (Riviana Foods), is offered at the National Zoo in Washington, D.C., so that the animals are encouraged to eat a balanced diet first thing in the morning.

In the afternoon (1:30 p.m. to 2:30 p.m.), the animals receive apples, bananas, raisins, oranges, and marmoset diet. Crickets and mealworms are fed to the animals once a week on different days (insects could be maintained on a high calcium feed mixture several days before being fed to tamarins). Additional sources of protein are recommended in case the marmoset diet used is deficient in protein (seeds, eggs, cottage cheese and milk). Food items should be varied to provide social stimulation.

Some institutions offer small amounts of fruit in the a.m. and p.m. in addition to the marmoset diet to entice animals to come to the cage fronts for close inspection.

As of September 1991, no mouse pups should be fed to golden lion tamarins. The risk of animals contracting callitrichids hepatitis virus from the mice, which are carriers, is too great. Zoos should rely on meal worms, crickets, egg, and other safe protein sources for their tamarins.

Since the animals are ready to go to sleep around 5:00 p.m. and the feeding bouts are only 5 to 10 min. long, we suggest that the feedings are spaced in time to give them 4 to 5 hours between feedings.

Example Diet at National Zoological Park, Washington:

Morning Feed: Each animal receives 3/4 slices of commercial marmoset diet. One can of diet is divided into six slices.

Afternoon Feed: Again each animal receives 3/4 slices of fresh Marmoset Diet.

Raisins: 5 per animal, or 1 to 2 grapes

Banana: 1 slice per animal divided into four pieces

Orange: approximately 1/8 orange per individual (sliced with rind attached)

Apple: approximately 1/8 apple per individual sliced in small cubes (1/2 inch).

Vegetables: 3 to 4 small pieces of each green bean, carrot, sweet potato, kale

Crickets (6 per animal): Wednesday and Friday

Mealworms (8 per animal): 3 to 4 times per week

Hard boiled egg: 2 times per week (1/4 of an egg per animal)

If diet needs to be supplemented, add cottage cheese or hard boiled egg. This will increase protein content. Crickets and mealworms are offered alive.

Diets at the Frankfurt Zoological Park, West Germany:

8:00 a.m. Some crickets vitaminized with vitamin B-complex (2 times per week with Ca-frubiase). If no crickets are available, they are offered pieces of bananas.

9:30 a.m. ca. 25-40 ml monkey pap per animal with the following ingredients:

1	1 boiled porridge
250 g	g curds (low fat-value)
6	raw eggs
75	g animal proteins (concentrated)
210	g concentrated plant protein mixture
210	g children food mixture
250	g dextrose
2	tablespoons of honey
140	g mineral salt mixture
35	g ROVOMIX
30	g dry yeast or barm

= mixed with ca. 1.5 liter, it makes about 4 liter of pap

Vitamin supplements:

1 teaspoon B-complex or
1 teaspoon Vitacombex or
20 drops Multimulsin or
1 ampule Frubiase Calcium f.

11:30 a.m. About 6 g monkey dumpling per animal with the following ingredients:

2	boiled eggs
1	banana
1-2	carrots
1	apple

All these ingredients should be reduced into small pieces and mixed with:

70	g concentrated animal protein
90	g concentrated plant protein
150	g dextrose
70	g mineral salt mixture
20	g ROVIMIX
30	g yeast or bram
50	g germinated wheat
110	g wheat bran

2 tablespoon honey

All ingredients, if kneaded with wheat bran and children food mixture, give a rough crumbly mixture. Per animal ca. 120 g small pieces of fruit and vegetables as available (orange, lemon, apple, banana, cherry, grapes, peaches, kiwi, onion, tomatoes, carrots).

Dried Fruits (raisins and bananas)

About 2 g cattle heart cut into small pieces

About 4 g boiled egg.

1:00 p.m. Offer tea and remove the pap.

4:00 p.m. Feeding live insects, per animal:

2-3 grasshoppers, or

6-8 crickets, or

6-8 wax moth

Diets at Jersey Wildlife Preservation Trust:

These animals are kept in various pairs, groups, and families, and are fed together from shared dishes (1 dish per 2-3 animals) with some food items being offered on an individual basis. There are 3 meals each day. Adult *Leontopithecus* weigh 600-700 g. This feeding program shows an average quantity for a *Saguinus* sp.

9:00 a.m. Prepared marmoset mixture 30 g

12:00 noon apple 45 g
orange 20 g
banana 15 g
carrot, cucumber,
potato, or celery 10 g
plus 2 additional fruits in season 15 g

Plus a selected high-protein food on rotation:

Days 1 & 5	hard-boiled egg in shell	8 g
Days 2 & 4	proprietary catfood, e.g. Kit-e-Kat	13 g
Day 3	calfmeat (heart and liver)	7 g
Day 6	hard (cheddar) cheese	5 g
	with yogurt	1 tsp.
Day 7	unshelled peanuts & Marmoset jelly	5 g

4:00 p.m. A selected food item on rotation:

Day 2, 3, 5, 7 brown bread soaked in raw egg
Day 6 mealworms or other insects as available.
e.g. crickets, locust, waxmoth larvae.

All fruits and vegetables are cut into small cubes and mixed loosely together. Actual quantities given will vary according to species, size of group, and the composition and general condition of groups.

Vitamin Supplements:

Vitamin E (Rovimix) once daily in second feed, 5 mg per animal

Vitamin D₃ (Rovimix) occasionally to individuals deprived of access to sunlight through illness, quarantine, adverse weather; 2500 i.u. each, weekly

Vitamin B₁₂ (Cytaccon) once weekly in the marmoset mixture; 2 ml each

Note: Lactating females receive condensed milk (diluted 1:10 with water) for 7 – 14 days post-partum at a rate of 50 ml/day. This is continued up to weaning age around 6-8 weeks on alternate days only.

Marmoset mixture:

This mixture has been devised to increase the palatability of the Mazuri New World Primate pellet that forms the basis for the first meal of the day. The mixture is prepared by soaking primate pellets in an equal volume of water and mixing this with $\frac{3}{4}$ loaf of crumbled brown bread, high protein baby cereal and golden syrup. The mixture should sit for several hours to ensure softening of the pellets, and it is therefore made up the night before feeding and stored in a cool place.

An average composition of the mixture is:

Mazuri New World Primate Pellets	750 g
Water	830 ml
Crumbled brown bread	255 g
Baby cereal (Boots' 30% protein)	40 g
Golden syrup (2 tablespoons)	45 g

S.D.S. Marmoset Jelly:

This is a high protein, high energy food that is prepared by dissolving a powder and a flavor premix in hot water and allowing it to set. The resultant gel is cut into small cubes and offered to specimens once weekly. (For more details, contact the National Zoo or the Jersey Zoo).

Reintroducing golden lion tamarins back into the wild has shown us that feeding whole fruits and eggs is stimulating and a challenge to problem solving for the animals. (Examples: whole bananas for a family group once a week, whole oranges with a small hole cut into the rind, whole papaya hung from a branch, bird eggs in a nest, mealworms hidden in rotten logs, crickets hidden in a bromeliad, etc.). Caution needs to be taken that there is not too great a reduction in the consumption of the main, nutritionally complete diet; be it canned, self prepared or pellets.

B. Water: Fresh water provided in crocks, ponds or water bottles should be available at all times.

Food and water dishes should be sanitized daily to prevent build-up, especially *Pseudomonas*.

C. Feeding Behavior: Food sharing and stealing is common within family groups and serves to teach young about important food items.

D. Additional Comments on Food and Feeding: Certain animals may get diarrhea periodically. Temporary restriction to only the Science Diet Marmoset Ration may clear up the problem. If animals refuse the prepared diet or concentrate on fruit, hand feeding with nutritious foods that are preferred may initiate proper feeding again. A drop in food intake must be carefully watched. Oral medicines may be hand-fed to individuals in favorite foods like bananas or grapes.