

Red Panda Guidelines... for management and husbandry.

Miles Roberts and Angela Glatston developed the management and husbandry guidelines listed below. They are the guidelines currently recommended by the Red Panda SSP, the Studbook and the International Red Panda Management Group.

Diet

1. General nutrition: Red pandas should be provided with a nutritionally balanced diet of a composition such as that shown in table 1.

Dietary ingredients should be as fresh and of good quality - Every effort should be taken to avoid spoilage of the food during warm weather and freezing during cold. The use of a dry biscuit should help eliminate these kinds of problems. To further reduce this problem it is suggested that the animals are fed at least twice per day; at these times fresh food should be provided and the old food removed.

In order to monitor food uptake and prevent disease it is recommended that food be presented in such a way that it is inaccessible to vermin. One solution to this problem is the feeding hut described in Studbook.

2 Gruel/Biscuit

Under normal circumstances red pandas should not be provided with gruel. The exceptions to this are discussed below

Every effort should be made to convert red pandas to a nutritionally complete biscuit (pellet/cake is included in this term) diet. This biscuit should be very similar in nutrient composition to the one listed in table 2. Marion Zoological (Marion, Kansas) and Mazuri Feeds (Purina Mills, Richmond, IN) both make biscuits which have been used with success in North American Zoos. it is important to note that if one biscuit does not prove palatable, others may be used as long as they fall within the nutrient guidelines. Adult animals with a body weight of between five and six kilos, have been found to consume between 145-200 g. of biscuits (as fed) each day. This was measured in a maintenance situation i.e. when the animals were under little stress from the weather, not pregnant or lactating and in the absence of any other food item.

Food consumption should be monitored closely and adjustments made in accordance with the number, size, weight and nutritional condition of the animals. Red pandas have a higher energy requirement in the winter months and probably also in late gestation, during lactation and especially during growth. During these times the animals should always be fed enough so as to have at least 3 % of the total food offered is left uneaten.

When animals are housed together it may be important to offer food in more than one bowl and in several locations. This will ensure that all animals will have access to the same food items and will help prevent one animal from potentially dominating the food situation and excluding others from the more nutritious components of the diet.

Red pandas which are off their food (this can occur in varying circumstances) can be tempted to eat by a sweetened gruel or by smearing their biscuits with a sweet product. (Slightly soaking the biscuits in orange juice has worked in some zoos). It is important that the sweetener/ gruel is withdrawn from the diet as soon as possible to avoid dental problems.

Young pandas around the time of weaning are susceptible to death through starvation. Such deaths have been reported in young pandas ranging between 5-7 months. It is important to check young pandas regularly at this time. Young animals which are not accepting the normal diet adequately should be provided with a sweetened gruel and extra bamboo at this time. They can then be weaned onto the normal diet gradually.

2. Bamboo

If possible 200 g. of fresh bamboo leaves should be offered daily to each animal. The preferred sorts are *Pseudosomas spp.*

It is desirable to obtain representative samples of the bamboo offered throughout the year and to have them chemically analyzed. Such an analysis is best conducted in a forage laboratory such as those of the local university or agricultural agencies. Protein (CP), fat (EE), acid detergent fiber (ADF), calcium (Ca) and phosphorous (P) are the main nutrients needed. If bamboo samples are similar in composition to the biscuit portion of the diet (no less than 18% protein, 0.5% CA and 0.4% P in a 1:1 to 2:1 Ca:P ratio) then more bamboo may be offered than the recommended 400 g of bamboo leaves, up to a maximum of 400g.

If bamboo is unavailable or seasonally available then fiber must be incorporated into the concentrate portion of the diet (the biscuit). If an appropriate biscuit is not provided than an additional fiber source such as ground beet pulp must be provided in some acceptable form (possibly unsweetened gruel) or through an adequate source of grass and plants in the enclosure.

3. Fruit and vegetables These are not important nutritionally to the diet of the red panda, in fact they can be harmful especially if offered in large quantities as they will dilute the nutrients in the biscuit thus lowering the nutrient content of the diet.

Fruit and vegetables can be useful when providing medications to the animals as undesirable substances can be presented in a palatable form.

4. Water Fresh water must be available to all animals at all times of day. Care must be taken so that sufficient water is available and freezing is avoided. Sturdy ceramic bowls are usually suitable for providing water, where there is no fresh water available in the exhibit, as they are not easily inverted. Animals with restricted water intake will also decrease food intake.

Hand-Rearing

1. Due to a powerful sucking response that could result in aspiration of liquid, animals

should be fed initially by stomach tube (size 5-10 French, depending on animal size). A measured volume is delivered by syringe. The procedure is simple and easily taught to handlers by veterinary staff. Attempts at bottle feeding should be delayed until animals are well stabilized to milk formula (one week longer, depending on animal age and condition). Initial bottle feeding attempts should utilize a sterile solution of 5 % dextrose and 0.9% NaCl in case of aspiration. For young pandas the small teats designed for premature human infants may be appropriate. Bottle feeding can be adopted when controlled sucking is obtained. The size of the hole in the teat is important for regulation of milk flow rate and should be monitored periodically to avoid excessive milk flow.

2. The milk formula used is a solution of powdered Esbilac (Borden, Inc.) in boiled water to which a lactase enzyme preparation (Lactaid; Lactaid., 600 Fire Rd, P.O. Box 111, Pleasantville, N.J. 08232) is added at rate of 1 drop per 100g formula. (Lactaid is available is a product used by persons with lactose intolerance). The formula should be predigested with the enzyme for 24 hours in a refrigerator or for 90 minutes at 90-95F (e.g. in a water bath). Due to possible bacterial contamination we use the 24 hour formula for one day only (discard at 48 hours after initial preparation). 90 minute formula is kept for only 12 hours prior to being discarded. Formula is kept refrigerated after the predigestion period and only the amount required for each feed is warmed prior to feeding.

3. For the first few feeds the formula should be very dilute (7 % Esbilac by weight, i.e. 7g Esbilac, 93g boiled water, 1 drop Lactaid) to allow acclimation to formula constituents. Formula concentration is gradually increased in stepwise fashion (10%, 12%, 15%, 18%, 20% Esbilac) according to animal performance and age. Thus the formula concentration might reach 15% strength in one week and 20% in three weeks. Formula is kept at this strength until weaning. In some instances pediatric vitamins (ABDEC, Parke-Davis, Morris Plains, N.J. 07950) or iron supplements have been given to hand reared red pandas but these not be necessary in most cases as Esbilac contains generous levels of these nutrients.

4. Animals are initially fed at 3 hour intervals (8x per day). As the animals stabilize and get stronger the interval can be increased to 4 hours (6x per day). The amount fed per day is based on body weight; therefore it is essential to weigh the animals each day. A typical regimen for the first week would be 25-30% of body weight distributed over 8 feeds (3.1-3.8 % of body weight per feed). The amount to feed is recalculated at 3-4 days intervals based on body weight changes. As the animal ages the percentage of body weight fed per day is gradually reduced, e.g. at about one month old the panda is fed 20-25 % of its body weight per day, at 2 months old 16-18% per day and at 3 months old about 15% per day. These amounts are modeled after milk intakes of mother-reared carnivores; small (undersized) animals should be fed at the upper end of these percentage ranges.

5. Weaning is commenced at approximately 3 months by addition of panda gruel (see below) to formula (e.g. 1 tsp. per bottle). Then animals must be taught to feed from a bowl, which can prove difficult. In one case the teat had to be placed in the bowl of formula to initiate feeding. The amount of gruel added is gradually increased such that

animals are fully weaned by 5 to 6 months. Red pandas resist rapid dietary change. Bamboo and salad (apple carrot, green bean) are offered separately from about 70-90 days to allow manipulation and investigation, they may not be eaten at first. Water should be made available as solids are introduced.

6. The gruel to which animals are weaned is prepared daily, kept refrigerated and the excess discarded after 24 hours. A batch of about 760g is composed of the following: 114g Gerber's mixed cereal, 276g evaporated milk, 57g applesauce, 1 tablespoon vitamin-mineral supplement (Pervinal, Pet Products & Co., Brentwood, N.Y. 11717), 1/2 tablespoon honey, 2 egg yolks and 284 g boiled water.

7. Hand reared red pandas gain weight at a rate equal to or above that of mother-reared young. Weights of hand reared animals are provided below. Early weights of animals pulled due to small size are excluded (i.e. animals much smaller than those below are underweight) -

birth ca.	100 g	10 weeks	0.9 - 1.4 kg
2 weeks	160 - 210 g	3 months	1.3 - 1.9 kg
4 weeks	260 - 360 g	4 months	1.8 - 2.6 kg
6 weeks	460 - 650 g	5 months	2.4 - 3.7 kg
8 weeks	650 - 960 g	6 months	3.2 - 4.8 kg

8. Additional considerations: Animals should be reared as a group to prevent abnormal socialization as they mature. Since young animals tend to suck on each other, they may need to be housed separately for an initial period.

Stimulate young animals to induce elimination. Older animals may develop soreness in the anal region from frequent scent marking (anal rubbing) of objects in the enclosure.

The normal range for rectal temperature appears to be 95.4- 98F. Rectal temperatures above 99-100F may indicate a medical problem. Rectal temperature should be monitored once or twice a day in young animals.

Young pandas are initially kept in an incubator or warm box at 85-90 F. As they mature, they are prone to heat stress. Fans can help in hot weather.

Provide climbing apparatus for older animals but beware: red pandas are escape artists.

Nails will require periodic trimming, even so it may be necessary to wrap older animals in a towel for feeding to avoid scratches. Handlers, will need heavy trousers when animals start to climb on them.

9. In order to aid the development of a new milk substitute any zoo which has to sedate a lactating panda is asked to obtain a milk sample for analysis.