

Creating a Complex Captive Environment for Fruit Bats

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Exhibit furniture and foraging devices are two separate but connected components that create an enriched and complex captive environment for fruit bats. The goal of this enrichment is to stimulate natural foraging activity, such as flight, manipulation with thumbs and feet, and locomotion on branches.

A variety of fruit bats fly with food to feeding roosts and are capable of carrying large pieces. Food stealing between bats is a common activity, so bats may find a secure location for food consumption. This activity is also a means of predator avoidance, since potential predators will capture bats in fruiting trees. Providing exhibit furniture that is conducive to foraging and predator avoidance is an important facet of bat enrichment. Ropes and grapevines can be suspended around the perimeter of the enclosure (LeBlanc, 2000a). Plastic mesh ladders or cargo netting can provide a vertical dimension for climbing. Natural branches, palm fronds, small logs and live plants are also beneficial. Exhibit furniture should vary in diameter and in placement, allowing for both horizontal and vertical access. Bats should have a variety of roosting options for security and to minimize aggression.

Foraging devices that increase the challenge of obtaining food can also be used to promote flight in fruit bats, such as “spinning rakes” (see *The Shape of Enrichment*, Vol. 2 No. 4), “pollination poles” (Seyjagat, 1996), suspended boomer balls and nectar feeders (LeBlanc, 1999). Manipulation can be promoted in larger fruit bats with gravity feeders; long plastic chains baited with fruit, and with fruit kebabs (see *The Shape of Enrichment*, Vol. 9 No. 3 - 4) (LeBlanc, 2000b; Seguin et. al. 2000)



Nectar feeder

Roosting surfaces are also important in exhibit design, and can be beneficial as enrichment. Fruit bats wear down their nails by moving on a variety of surfaces. This benefits husbandry by reducing nail breakage and the need to trim overgrown nails. For those species that normally roost in caves, a cave-like structure can provide benefits in nail wear and also promote natural locomotion on these hard surfaces. Some species, like Jamaican and dog-faced fruit bats (*Artibeus jamaicensis*, *Cynopterus brachyotis*), build “tents” for roosting, and the provision of palm and banana leaves in the enclosure can promote this tent-building behavior. Roosting areas can also benefit from having an irregular ceiling, which would allow the more dominant bats to roost above less dominant individuals, thus allowing for vertical separation which is species-typical. Cage design should also provide areas for hiding and predator avoidance, especially if the bat species is known to flee toward enclosed areas when startled (Shepherdson, 1997).



Rousettus in a bucket!

In making changes to enclosure design and furniture, you may find that the bats need time to acclimate. Bats that are managed in wire mesh enclosures may be accustomed to this stable foothold and may be reluctant to leave its security to come down onto unfamiliar objects, like branches and vines. However, these more unstable and unpredictable surfaces provide opportunities for more natural behaviors, and are a good source of enrichment. At first, reluctant bats may need to be enticed onto new cage furniture with preferred items like cantaloupe, romaine lettuce or flowers, until they have gained confidence and muscle strength.

Another way to modify the environment within the enclosure is to create variations in humidity, temperature, and lighting. Colored lights have been used for enrichment with captive chimpanzees (Fritz, et al., 1997), and since fruit bats rely on vision they may also respond to this type of environmental enrichment.

One of the most important aspects of enrichment is novelty, which has been shown to increase the benefits of specific enrichment items by keeping animals from becoming habituated to them (Line et al., 1991; Sambrook and Buchanan-Smith, 1996). Enrichment items and

techniques vary in their complexity and responsiveness, and objects that an animal can control and that respond to the animal in some way have been shown to be used by a larger proportion of animals and for longer periods of time than less responsive objects (Markowitz and Line, 1989). In addition, complexity may be an important factor in promoting activity (Tripp, 1985). In creating a challenging environment for bats, it is critical to provide a variety of enrichment opportunities that vary in complexity and responsiveness, and to then evaluate which items provide the greatest benefit.

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