Fruit Bats, Sticks, Flight, and Nonfood Enrichment

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In early 1993, the director of the Lubee Foundation, Inc., John Seyjagat, made an intriguing discovery. During morning rounds, the Lubee staff observed several Rodrigues fruit bats *(Pteropus rodricensis)* on the ground of their enclosure, and one flew away with a stick in its mouth. Why would a fruit bat show any interest in manipulating a stick? Fruit bats do feed on a variety of food resources, including fruit, flowers, and leaves (Marshall, 1983; Pierson and Rainey, 1992), and they have also been observed to chew bark from willow *(Salix* spp.) branches. The sticks, in this instance, appeared to have no nutritional value, because they were dried.

Fruit bat
(Pteropus sp.)

This same event was also observed in 1996. Based on these observations, an informal study was undertaken to evaluate the potential of wooden dowels as nonfood enrichment. In the wild, fruit bats manipulate and sometimes transport a variety of objects of significant weight and dimension, including branches, leaves, and fruit. Three groups of Rodrigues fruit bats were offered a variety of spruce dowels that were 150 mm long and ranged in diameter from 4.5 to 20 mm (Seyjagat, 1996). The sticks ranged in weight from 4 to 25 grams. Several wooden dowels were dyed using blue, red, yellow, and green food coloring and shellac, while an equal number were left a natural wood color. The dowels were placed in large bowls not used for food and placed outside in the flight area both for day and night observations.

The bats of both sexes in all three groups showed interest in the wooden dowels, and they spent a large amount of time mainpulating them with both their feet and thumbs. Several dowels were found outside of the double-walled, 1-inch by 1.2-inch wire mesh enclsoure, after they were given to the bats. Play behavior (Carroll, 1979) appeared to be associated with the presence of the wooden dowels. This behavior took the form of two bats wrestling for control of the object, without aggressive vocalizations, and these interactions lasted several minutes. This play behavior may reinforce skills that fruit bats use in obtaining and protecting food resources, especially when feeding in a group situation where food stealing may be prominent. Even in the captive environment, where food is readily available, both captive-born and wild-captured bats have been observed stealing food from one other.

An added dimension to the behavior of these bats that we have observed is that they will fly with and transport the wooden dowels. Because bats are the only true flying mammal, enrichment techniques that stimulate them to exercise their flight muscles are highly desirable. The bats showed no observable preference for the colored dowels over the nontreated dowels during this informal study, but the sample size was small. A formal study will need to be performed in the future to evaluate any color preference shown by the fruit bats.

This nonfood enrichment technique allowed the Lubee staff to observe interesing behaviors in our Rodrigues fruit bats. The most important seemed to be individual ownership of the dowels, and the fact that the bats could manipulate and transport them.
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