# PRINCIPAL ASPECTS OF ENCLOSURE DESIGN FOR FLYING FOXES

**By John Seyjagat, taken from 1994 AZA REGIONAL CONFERENCE PROCEEDINGS**

Until 1961, there was no real desire to adequately exhibit bats in captivity (Morris D. IZYB 1962 V3 pg. 2) and to date lacks standard design based on bats biological and physiological requirements. Morris D., after reviewing several zoos' bats displays wrote in IZYB 1962 "most zoos do, of course, show a few bats hung up in small, totally inadequate cages like discarded aircraft or hairy canaries."

Today there are some 15 species of fruit bats in captivity in North America alone. Previously, the general design for fruit bats, or rather any bat holding facility, were governed by two mythical principles i.e. (1) "use it or loose it." The size of the cage should be such that the bat can fly freely or not at all (Greenhill 1976). (2) a bat drops from the ceiling to become airborne to fly, as a result, cage ceilings were very high.

In 1991, The Lubee Foundation, Inc. established a captive breeding facility for maintaining up to 12 species of fruit eating bats. Each species is housed in specifically designed quarters that allow the bats to roost in temperature controlled houses or fly in outdoor circular cages.

The enclosures are double wired, octagonal cages approximately 9 meters in diameter and 2 meters high. Within the flight cage is a temperature controlled octagonal building 3 meters in diameter referred to as the roost.

The flight cage is structured of 5.0cm X 2.5cm galvanized iron tubing. Each side of the octagon is 4.6m long by 2m high. The roof of the flight cage is 3m wide. The galvanized iron framework is fabricated on its 5.0cm width and enclosed on both sides with 14g wire mesh 2.5cm X 1cm. The result is the wire being 5.0 cm apart, constituting the double enclosure as required by the USDA for injurious wildlife.

The roost, also octagonal is 3m wide and constructed with T 111 siding on the outside and sealed non abrasive stucco on the inside and ceiling. Each of the octagonal sides are 1.5m wide and 2.5m high extending above the flight cage. In the roost are three windows 30cm high by 20cm wide located where the roof of the flight cage meets the walls of the roost. The main entrance to the flight cage and the roosts are on corresponding walls of the octagon.

The ceiling of the roost is domed with a wire panel extending from the lower 30cm of the circumference of the dome ceiling down to the upper 30cm of the circumference of the inner wall of the roost. This wire panel is attached to 2.5 x 2.5 galvanized tube which is mounted onto the wall keeping the contour.

The floor of the roost is sealed concrete and drains at the center of the building. On the inner walls of the roosts are sheets of vinyl coated wire 60cm wide x 2m long hanging from the ceiling and inside wire panels to serve as a ladder for the bats that accidentally end up on the floor to climb back to their resting area.

The floor of the outdoor flight cage is natural and turfed. Numerous shrubs are planted for aesthetics and enrichments.

These enclosures are extremely efficient and successful. The shrubs, together with selective perching provides for the physiological well being of the bats, and as such, encourage naturalistic behavior. The outdoor flight cage allows continuous flight with a change of scenery as the bats circle the roost. Food cups can be easily hung on the wire walls of the flight cage for outdoor feeding. The turf on the natural ground is low maintenance and provides for a soft landing.

The roost is equipped with a skylight, water spigot and heat and air exchange system. The roost allows easy cleaning because of the smooth nonporous walls and floors. Heavy wire panels on the ceilings allows the bats to roost on the ceiling and be fed inside in inclement weather. On very cold days (below 50°C) they can be locked in the roost by shutting the windows and doors.

These enclosures have been in operation since April 1991. If management success is based on

efficiency and animals contentment or reproduction, then I think this design has proved itself well.