Compliance challenges for capturing, transferring and keeping wild bats in captivity.

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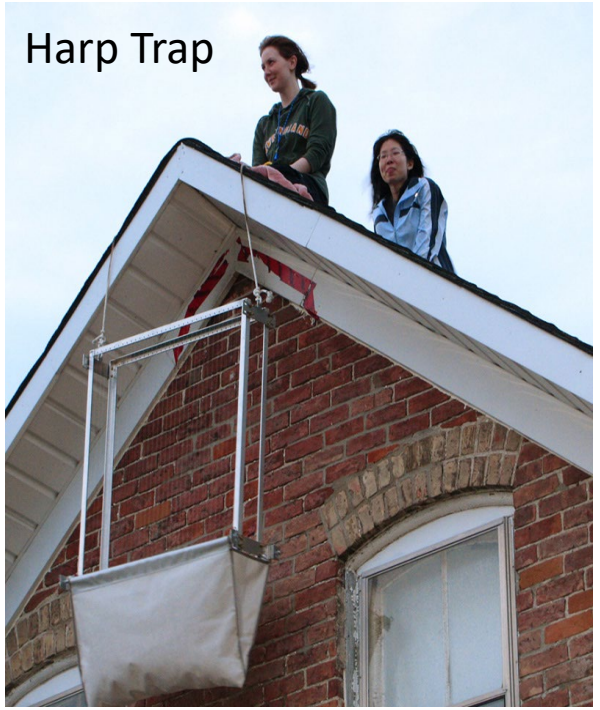
Overview

- Capture and Transport
- Primary Enclosures and Space Needs
- Temperature, Humidity and Heterothermy
- Managing Torpor and Hibernation

<u>Primary references</u>

Guide for the Care and use of Laboratory Animals
Guidelines for the Humane Transport of Research Animals
Guidelines of the American Society of Mammalogists for the use of wild mammals in research and education.

Capture



Transport

The Guide

“Transportation of animals in private vehicles is discouraged because of potential animal biosecurity, safety, health and liability risks for the animals, personnel and institution.”

Not realistic. In most cases there is no alternative to personal transport in privately owned vehicles.

Acclimation

First 24 hours –won’t eat or drink

Fruit bats eat fruit right away. Easier to acclimate.

Insect-eating bats.

- Must be hand-fed at first.
- Race to see which individuals will accept mealworms.
- Species & individual differences in willingness to eat mealworms.
- Nutri-Cal supplements or similar extends training time.

Those that won’t eat within 48 hours can be re-released at site of capture.

Primary Enclosures: 1)Room to fly 2) Multiple Roost Sites 3) Many Feeding stations.

Guide

"Animals should be housed under conditions that provide sufficient space to meet physical, physiologic, and behavioral needs ."

"…should also account for the animals' social needs."

" Structural adjustments are frequently required for social housing (e.g., perches, visual barriers, refuges)"

Rough/irregular surfaces to land on. A*coustical* enrichment breaks up echoes.

The Guide

"Less durable materials, such as wood, **may be appropriate** in select situations, e.g., outdoor corrals, perches, climbing structures, resting areas"

Photos courtesy Paul Faure, McMaster University

How Much Space?

Natural Roosts can be very dense :

100 bats per square foot isn't crazy.

Many bats can share a small house within a larger flight cage.

Short duration, such as during transport:

(<12 hours) (10-20 g bats) :

~ 25 bats/1-2 ft^3 cage

Long-term housing:

10-50 m^3 flight space (eg. 5x2x2 l,w,h)

Species-specific houses/perches/feeding

MAIN CHALLENGE

- Daily health inspection of individuals

The Guide: "All animals should be observed for signs of illness, injury, or abnormal behavior by a person trained to recognize such signs. As a rule, such observation should occur at least daily…"

Temperature, Humidity and Heterothermy

Bats are heterothermic.

Most use facultative daily torpor.

Thermoneutral Zone (TNZ) range of 22-33 ˚C.

Below <22 ˚C (72 ˚F) Daily Torpor or Hibernation

Social & Behavioral mechanisms for thermoregulation. Dense huddling or flight raise body temperature.

For most species, facility temperatures suitable for rodents appear generally suitable for bats.

The Guide:

In general, temperatures in animal rooms should be set below the animals' LCT to avoid heat stress.

The Guide recommends a range of 30-70% humidity for most lab animals.

Refs: Soriana et al. (2002) J. Mammal. 83;445-457. Stones, R.C. and J.E. Weibers (1965) Amer. Midland Natural 74:155-167..

Managing Torpor and Hibernation

Group housed during hibernation.

Daily inspections interrupt hibernation.

Video monitoring is preferable.

- During arousals, bats likely to drink, not eat.
- H_2O should be available.
- *Live mealworms* can't be in cage for months.

MAIN CHALLENGE
- Daily health inspection of individuals
- Food and Water availability

Photos courtesy DeeAnn Reeder & Ken Field, Bucknell University

Take-Home Message

Compliance issues arise from:

1) Flight + Sociality - impact space, surveillance

2) Heterothermy – impacts environment, surveillance.

3) Biosecurity – impacts space, transport,

Well-designed Primary Enclosure is essential.

Social Housing needs to be flexible.

Appropriate Cage Density - providing live food, fresh water, sanitation & surveillance is labor-intensive.

Daily Surveillance of individuals may not always be realizable.

Facultative Torpor is an advantage, not a problem to be solved.