



Novel Housing Alternatives for Group-Housed Ferrets

Jenna Hargens, BS, RLATG; April Yancy, DVM, MPH; Jan Gnad, DVM, DACLAM

Division of Comparative Medicine, Georgetown University Medical Center, Washington, DC



Abstract

Ferrets require escape-proof, enriched housing that allows social interaction and normal behavior. Based on the Guide and AWR space requirements for cats, we devised a modified tank enclosure to house up to three adult ferrets. We hypothesized that the ferrets would exhibit normal physical and social behavior in the escape-proof enclosure. The tank contained thick corncob bedding, a hammock, PVC tubes, a hut and toys. We observed 2 to 3 ferrets for 15-minute intervals in the morning and/or evening (116.5 hours) for 21 days. ANOVA and correlation analysis determined the average time spent in three categories (general activities, interactions with structural items and toy items) and the association between key activities and enrichment items. During an average 15 minute interval, the ferrets slept 6.6 minutes (44%, $p < 0.001$); explored their environment - 6 minutes (40%, $p < 0.001$); played with each other or with toys - 1.8 minutes (12%); or performed other activities (eating, climbing, etc.) - 0.6 minutes (4%). The ferrets interacted significantly with the hut and T-pipe ($R^2 = 0.6, 0.5, p < 0.01$) and often slept in these items. The ferrets routinely explored the bedding and cage items. Rotating toys provided novel enrichment, new scents and textures. However, the ferrets rarely played with the toys except upon first introduction. Play time was spent mostly with the hammock ($R^2 = 0.85, p < 0.05$), Kong Toy ($R^2 = 0.77, p < 0.001$) and the PVC cylinder ($R^2 = 0.74$) and Tug Toy ($R^2 = 0.66, p < 0.001$). The group-housed ferrets showed normal interactions and behavior in the new tank environment. Although they slept most of the time, the ferrets interacted well with one another and fully utilized the extra space, bedding, PVC pipes, hammock and hut.

Materials



Figs. A,B. GU DCM Ferret Housing A) Single housing units, cat cage. B) Fully modified galvanized steel tank. Fig. C (1-2). Ferrets in the DCM caging. Ferrets are housed in an AAALAC accredited facility under a 12:12 light cycle, fed Purina ferret chow and provided water *ad libitum*.

- Galvanized steel tank (AGRI Supply®, Garner, NC) 24"W x 24"H x 5'L with a 1 inch side drain
- Stainless steel J-feeder (affixed to the inside of the cage) and 1 liter water bottle (Lab Products®, Inc., Seaford, DE)
- Small 1/4" mesh steel lid secured by coiled springs and latches
- Corncob bedding, 1 inch thick (Bio-Serv®, Frenchtown, NJ)
- PVC tubes (6" diameter x 12"L and 8"L, straight and T-pipe)
- Toys (Bio-Serv®, Frenchtown, NJ)
 - Plastic dumbbells, Kong Toy, Tug Toy
 - Translucent hut (12"L x by 8"W x 7"H)
- Hammock (SuperPets®, LLC., Elk Grove Village, IL)
- Three male ferrets (Marshal BioResources, North Rose, NY)



Introduction

Ferrets are common laboratory animals that can replace dogs, cats and non human primates in various research studies.² In smaller research facilities, ferret standing populations may fluctuate, therefore, commercially available ferret housing may not be purchased. Facilities may opt to single or group-house ferrets in modified rabbit or cat cages for cost saving. The ferret is a naturally curious and active species with an amazing ability to escape through small holes or spaces. It easily destroys caging with any holes or unprotected edges.⁵ Caging must be escape-proof and include enough space for sleep, play and elimination. Ferrets are social and should be group-housed whenever possible.

Ferret Facts: Mustelidae (weasel family), crepuscular (active at dusk and dawn)

- Average size: male - 1.0 to 2.0 kg (2 - 5 lbs), female - 0.5 to 1.0 kg (1 - 2.5 lbs)
- Average body length: 44 to 46 cm (nose to tail tip)²

We based our enclosure size on the average size of adult ferrets and on the regulatory requirements to provide 3.0 ft² (0.28 m²) floor space and 24" (60.8 cm) height, for cats.^{1,3} Neither the Institute of Laboratory Animal Resources (ILAR) Guide nor the Animal Welfare Regulations (AWR) specify floor space requirements for single or group-housed ferrets.

Purpose: To group-house up to 3 adult ferrets in an enriched, safe and escape-proof enclosure and to determine how the ferrets utilize the space and key enrichment items.

Hypothesis

We hypothesized that three adult ferrets would exhibit normal physical and social behavior in the escape proof, modified tank enclosure.

Methods and Results

Study Design:

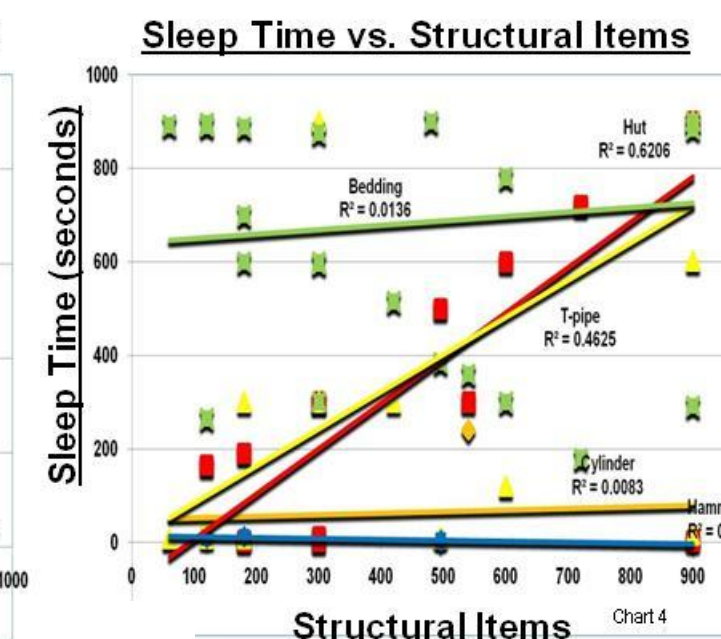
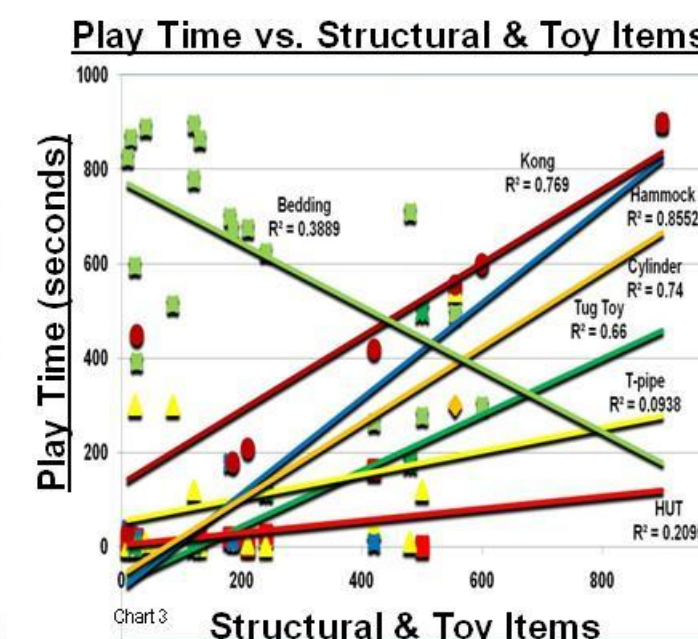
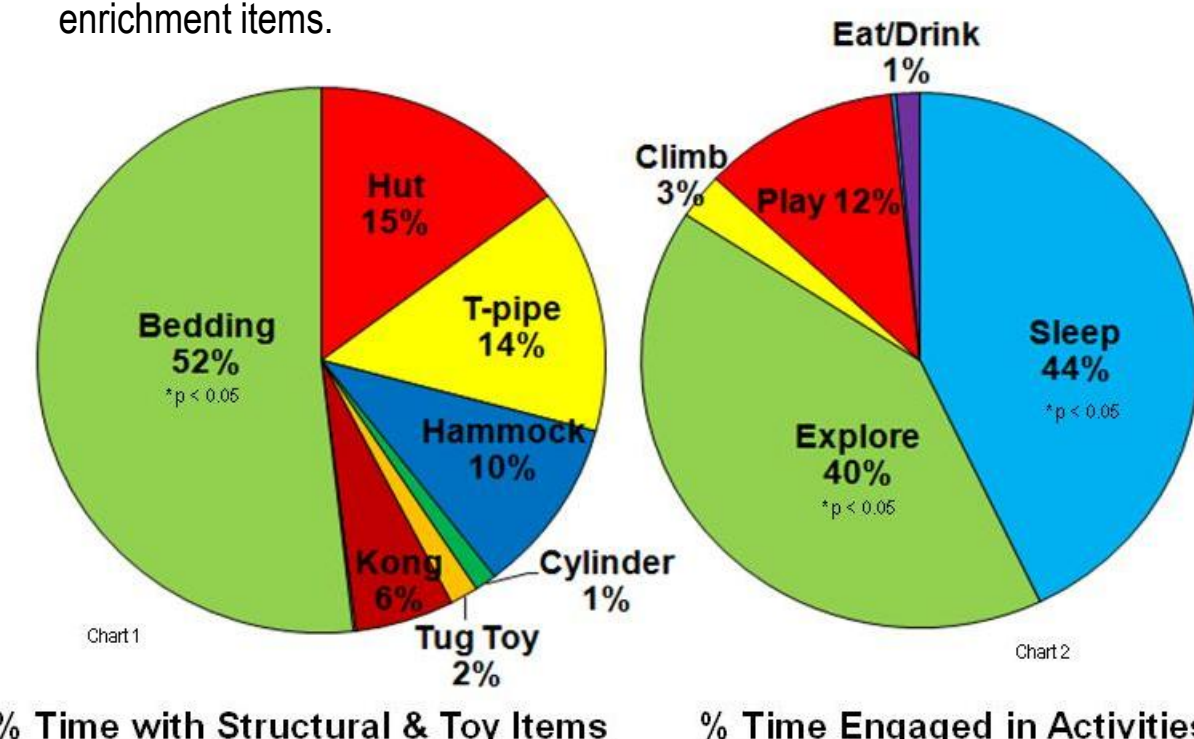
- Male ferrets (n = 2 or 3 per observation).
- Daily observation: AM and PM for 2 months - 64 fifteen minute intervals per ferret (116.5 hrs, 192 events).
- Record the average number of seconds spent with each activity or item and determine the correlation between activities and enrichment items.

Results:

Activity	Average Minutes per Observation Period		
	Structures	Toys	
Sleep	6.6 *	Bedding 7.8 *	Kong Toy 0.9
Play	1.8	Hut 2.25	Tug Toy 0.3
Eat/Drink	0.15	T-pipe 2.1	Ball 0.0
Climb	0.45	Hammock 1.5	Dumb bell 0.0
Explore	6.0 *	Cylinder 0.15	* $p < 0.05$

Analysis:

- Ferrets slept more than any other activity.
- Ferrets explored their enclosure almost as much as they slept ($R^2 = 0.78$, negative trend).
- Ferrets used the thick bedding more than they used any structure or toy ($p < 0.05$).
- There was a positive trend between sleeping and the hut and T-pipe ($R^2 = 0.62; 0.46, p < 0.01$).
- There was a positive trend (R^2 ; $p < 0.5$) between play time and the hammock (0.85*), Kong Toy (0.77*), PVC cylinder (0.74) and Tug Toy (0.66*).



Discussion

We determined activity levels and preference for various enrichment items for group-housed ferrets in a modified tank environment. The ferrets showed normal interactions, play and exploring/foraging behavior. The data indicates that ferrets used structures for sleeping (hut and PVC T-pipe) and play (hammock and PVC cylinder). The ferrets explored their surroundings almost as much as they slept. Rotating toys provided novel enrichment, new scents and textures. However, the ferrets rarely played with the toys except upon first introduction.

The modified tank offered several advantages over single-housing cat condo units:

- The large floor space provided greater areas for enrichment items and exploring.
- Physical contact with cage mates provided social enrichment.
- The large lid enhanced daily observation and access to ferrets.
- The smooth interior walls prevented injuries and the cage latches prevented escapes.
- The food and water remained unsoiled since access was above floor level.
- Materials and hardware were readily available and cost effective.

Smith reported hind limb and other skeletal changes in ferrets housed in cages that restrict movement.⁸ Isolation induced effects on behavior, such as deprivation of physical activity and group social play, cause hyperactivity that persists into adulthood.⁸ Our ferrets played and interacted with each other and the enrichment device and displayed no signs of behavioral abnormalities, pain or distress.

Straube reported zinc toxicity (fatal nephrosis) in ferrets due to animals licking raw meat diets off the bars and walls of damaged wire caging.⁷ All of these cage surfaces were coated with a white, zinc-laden powder (2400 ppm) that formed as a result of steam sterilization at 82.2 °C (180 °F) for 20 minutes. No signs of toxicity developed in ferrets housed in the study tank. However, to avoid damaging the tank, a non-acid detergent (Anlage 128, Quip Labs®, Wilmington, DE) at 180 °F was used for 20 minutes, followed by a 10 minute water rinse at 180 °F. Staff used an air blower to dry the tank and inspected the tank frequently for pitting, rust or damage.

Conclusions

Group-housed ferrets interacted well with each another and fully utilized the extra space, bedding, PVC pipes, hammock and hut. Ferrets primarily slept and explored their environment. Rotating toys provided novel enrichment, new scents and textures. However, the animals rarely played with the toys except upon first introduction.

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