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**Dedicated Issue on Ungulate Husbandry,
Training, Enrichment & Conservation**

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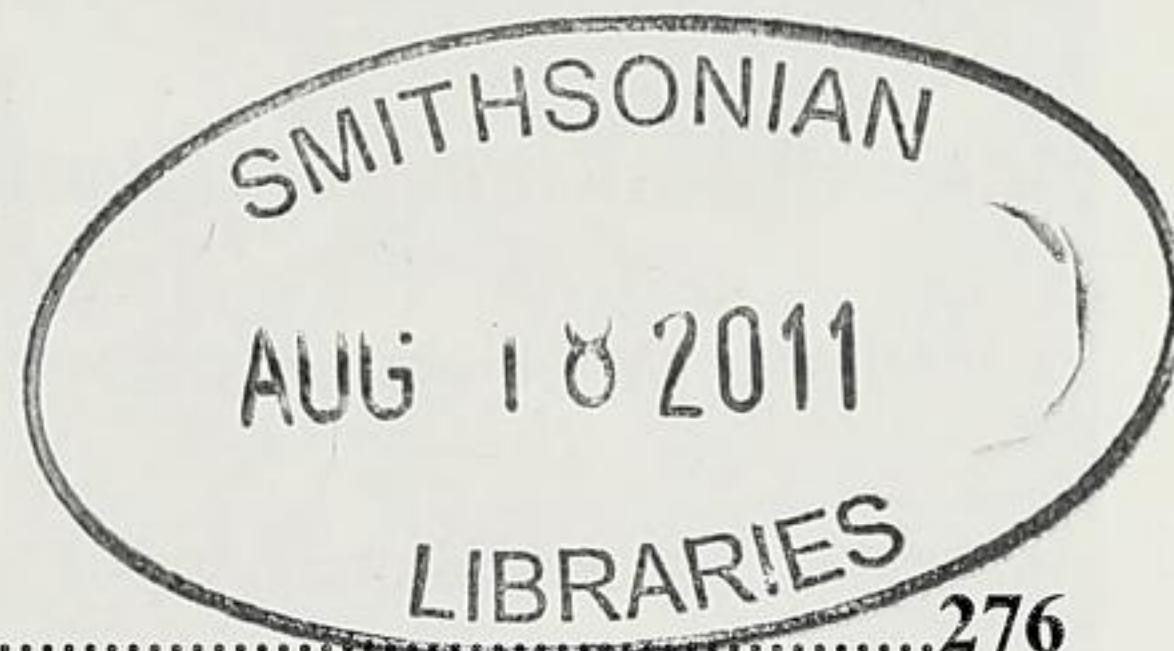
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About the Cover ~ This month's cover features a Lowland Nyala bull (*Tragelaphus angasii*) on the Pembe Savannah at Disney's Animal Kingdom Lodge in Lake Buena Vista, FL. This species is exhibited in a mixed-species display on the savannah outside of the Lodge where guests may observe the animals and their behaviors from their private balconies. The photographer for our Dedicated Ungulate Issue is Lindsey D. Kirkman, Animal Keeper at Disney's Animal Kingdom Lodge. Thank you, Lindsey!

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37th Anniversary - 1974 - 2011

Zoo Atlanta's Hoofstock Enrichment Program

By Nichole Bouwens, Senior Keeper
Zoo Atlanta, Atlanta, GA

At Zoo Atlanta we have an enrichment program for our hoofstock in which every animal receives enrichment of some type daily. Examples of what our animals receive are categorized by scent (perfumes, spices, colognes, and extracts), object (novel feeders, new furniture, toys), audio (various nature sounds or soft music) and food (novel items that are not a part of an animal's 'normal' diet). We strive to diversify the enrichment items offered so that the animals are stimulated in a number of ways.

Enrichment Type and Role

Objects are very important to our enrichment program. Some items are hung to provide sparring opportunities; some items are designed to prolong feeding time, while others are more for visual stimulation. Objects with different textures are offered in a variety of shapes, sizes, and colors. Because we offer such diverse items, some animals more readily accept certain objects that we use during training sessions, such as target poles, vet totes, carts, and crates. We successfully trained a yellow-backed duiker (*Cephalophus silvicultor*) to stand in front of a yellow radiograph machine by first training her to stand in front of a yellow kitty litter container bolted to a wooden platform. Because the duiker was already accustomed to the kitty litter container, training for the x-ray was easier and less stressful for the animal (Bouwens et al, 2008).

When offering scent enrichment, our goal is to introduce the animals to a smell that they are not accustomed to, and/or provide an opportunity for the animals to explore their environment. The scents that we provide our hoofstock are spices, extracts, perfumes/colognes and bedding or furniture from another animal's area. We also attempt to vary the ways in which the scents are offered and their location. Scents are put on walls, floors, bedding, props, and substrate. We have used scent enrichment during the initial stages of training as well. Our male waterbuck (*Kobus ellipsiprymnus*) had been very reluctant to approach a scale platform despite the keepers trying numerous training methods and various rewards. When some of the female waterbuck's bedding was placed onto the platform, the male stepped right up onto the platform with no hesitation. He stayed on the platform for a few minutes sniffing every single piece of the hay. After that day he stepped up onto the platform regularly without pause.

Our audio enrichment library consists of hanging small, soft-sounding wind chimes outside in the corral areas or playing one of over 50 CD's ranging from classical music to various nature settings. The nature CD's cover a wide variety of sounds such as ocean waves, sounds of the jungle, whale songs, frog calls, bird calls, and sounds from the African plains. These CD's are generally played in the barn when the animals have access to an outdoor area. That way the animals have the choice to go outside to avoid the sounds. Audio enrichment is always played at a low volume and animals are monitored to make certain they do not react negatively. We have noted that the giraffes (*Giraffa camelopardalis reticulata*) are very attentive when whale sounds are played, while the bongos (*Tragelaphus eurycerus*) have reacted with an alert posture to lion roars, despite hearing daily roars from the lion exhibit located across the public path.

Although audio enrichment (as well as other types of enrichment) may not give the "wow" reaction that we often look for when offering enrichment, it can arouse the animals and heighten their awareness. As we all know, in the wild animals are bombarded with sensory stimulation and they must determine what is detrimental versus what is benign. So even though auditory, and often times scent enrichment, may not elicit overwhelming responses, we believe that the animals are still being enriched.

Foods are another type of enrichment that the hoofstock animals receive. Browse is part of some animals' daily diets, and for others, browse is offered as often as possible. Other foods that are offered in small quantities are no sugar added jellies, produce, peanut butter, sugar cane, and leaf-

eater biscuits. In some cases, we can more easily medicate animals with foods that they only receive occasionally, so knowing which foods an animal prefers is very helpful. Also, some of these foods are offered during training sessions as jackpots.

Another great way that we can enrich our hoofstock is to move animals around to different stalls and corrals. This provides the animals with a variety of new scents and props to investigate, and many times the neighboring animals housed on either side are different as well.

Record Keeping

In order to make certain that the animals receive enrichment of all types every week, the keepers use a monthly calendar that lists a category of enrichment that should be provided for each species, each day. According to the sample calendar in Figure 1, Tuesdays in the month of February are scent days for most species, so all of these animals should receive a scent of some sort. Each month the categories are randomly reassigned to different days.

Figure 1

Sample Enrichment Schedule for November							
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Rhino	audio	food	scent	scent	keeper choice	object	training
Giraffe	tongue manipulation	food	training	audio	keeper choice	object	scent
Zebra	training	food	Scent	scent	keeper choice	object	audio
Duikers	object	food	Scent	scent	keeper choice	training	audio
Waterbuck	object	food	Scent	scent	keeper choice	object	audio
Bongo	object	food	scent	training	keeper choice	object	audio

Because of time constraints and varying keeper schedules, categories are used instead of specifying a particular enrichment item to be offered. This approach allows the keepers the flexibility and creativity to choose items that they prefer to use.

Because we have a number of animals to enrich, we tend to have the same or similar categories for all of the animals for the day. For instance, if the black rhinos (*Diceros bicornis*) have food enrichment



Zoo Atlanta black rhino enjoying enrichment items.

(Photo: Adam K. Thompson/ZooAtlanta)

on Thursday, most, if not all, of the other animals will also receive food enrichment that day. We have found that it is easier and less time-consuming for the keeper to gather and distribute enrichment this way. It should also be mentioned that keepers must give at least one item from the daily category, but keepers are encouraged to offer additional enrichment from the same or different categories. For instance a keeper can give an animal browse (food) and a traffic cone (object) on the same day, as long as at least one of the items given is from that day's category.

The enrichment categories that we use for the calendar are audio, training, object, keeper choice, scent, and food. On a day when the category is keeper choice, the keepers can offer any enrichment item they want from the category of their choice. The giraffes have an additional category, called tongue feeder manipulation. Our giraffes are almost exclusively fed grain from a five-gallon plastic water jug hung from a pulley

rope in their holding area. This type of feeder prolongs feeding time and increases the amount of tongue manipulation the giraffe must use to get to their food (Bouwens, 2003). At least once weekly, various objects such as KONG® toys, Wiffle® Balls, small PVC pieces, or plastic/rubber dog toys are put inside these feeders. The giraffes must maneuver their tongues around these objects to get to their grain. This extends feeding time and exposes the giraffes to different textures and feeding challenges.

To select an enrichment item for an animal, the keeper first checks the enrichment calendar to see what category is assigned to that day. Then the keeper refers to the record form to determine what enrichment from that category has not been used with that animal within the last two months. Our form is an Excel® file that has the various categories listed in columns. See an abbreviated version of our record form in Figure 2. All of the approved enrichment items in a given category are listed below the category name. When an item is used, the date it is used and initials of the keeper who provided the item are recorded under the animal's name.

Figure 2

Duiker Enrichment								
Scents	Date Offered	Audio	Date Offered	Objects	Date Offered		Foods	Date Offered
Allspice	EF 1/18	Africa Awakens		55 gal Barrel			Alfalfa cubes	
Anise		African Journey	CD 1/16	5 gallon bucket (no handles)	AB 1/17		Allfruit	
Basil		Amazing Amazon		Bamboo/PVC windchimes			Applesauce	1/19 EF
Caraway Seed		Amazon Odyssey		Blue feeder container			Berries	

Some approved items can't be used at all times because they are seasonal or need to be replaced, built, repaired, or purchased. These items are listed in a separate group underneath the list of available items to prevent confusion. With these items separated from the others, keepers and curators can easily see what items need to be addressed.

This system has worked well for the hoofstock department. We are able to record items, see what has been used recently and keep up with broken items or report when items have run out. Generally one person oversees the inventory of enrichment supplies and ensures approved items are available. This person also changes the calendar every month, clears the record form, and archives the old enrichment records.

Providing our hoofstock animals with ever-changing environments helps them cope with change and allows them to adjust more easily to it. It is important to note that whenever a new item is added to our enrichment program, keepers monitor the animal's initial reactions. If the animal is overly fearful or aggressive, the item is removed immediately.

All of the enrichment items offered are done so with a purpose and a goal. Because of this we have a very successful enrichment program that has facilitated training and many other husbandry practices.

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