
collections. Lastly, we want to acknowledge “Anna”, a twelve-year-old giant anteater, who brought us to the realization of just how mysterious and amazing a creature this edentate species can be.

Giant Anteater (*Myrmecophaga tridactyla*) Diet Survey

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Introduction

The Giant Anteater Survey is comprised of four separate sections designed to target specific questions and issues involved in the overall care and management of the giant anteater (*Myrmecophaga tridactyla*). The four sections to this survey and their status in terms of completion are as follows: 1) Health Care – results compiled and distributed July 2001; 2) Diet – results compiled; 3) Housing – results in process of being compiled for distribution; and 4) Neonatal Care – survey questionnaire to be distributed at a later date. Due to the shortage of published information on these topics, the Giant Anteater Survey creates an opportunity to share valuable information and experience among institutions that maintain giant anteaters as part of their collection.

The primary purpose of the Diet section was to look at the trends in giant anteater diets currently being fed in captivity. In addition, behavioral enrichment items as well as types of vitamin and mineral supplements used in the daily diet are discussed. The information presented is based on the survey responses provided by 21 of 24 institutions currently housing giant anteaters.

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It is important to note that the Diet Survey Results are designed to simply present what different institutions choose to feed giant anteaters in their collections. No outside research on nutritional values or overall diet-related health concerns were performed on the authors' part unless noted. It is our hope that the results of the Diet Survey will provide a better understanding of the nutritional needs of the giant anteater and how different institutions might attempt to meet these requirements.

Graphs Interpreted

Four graphs were created to illustrate the survey results for the following four topics: 1) Individual food items in diet; 2) Staple diets; 3) Vitamin and mineral supplements; 4) Behavioral enrichment items. The information is current up to May 15, 2001, when compilation of the survey data was begun.

Individual food items in the diet

Figure 1 represents the individual food ingredients comprising the anteater diets at 21 institutions housing giant anteaters. These ingredients do not represent behavioral enrichment items or “treats” given to the anteaters. Instead, these individual food items are fed in various combinations with one another to create a daily diet. As the graph indicates, the three most common ingredients used in the anteater diet include Leaf-Eater, dry dog food, and dry cat food. In comparison, the rest of the food items listed are not used as broadly by the 21 respondents. An interesting finding was the predominance of Leaf-Eater in giant anteater diets. Of the 21 responding institutions, 67% incorporated Leaf-Eater in their diets. Some of the respondents indicated that the reason for this was because Leaf-Eater is naturally high in vitamin K, something captive anteaters tend to become deficient in. Also, Leaf-Eater is high in cellulose, which is reported to provide gut fill, thus promoting fecal consistency (Edwards, n.d.). Many of the respondents indicated that the addition of Leaf-Eater to the daily diet helped alleviate some of the problems with chronic loose stool that have become common with captive giant anteaters.

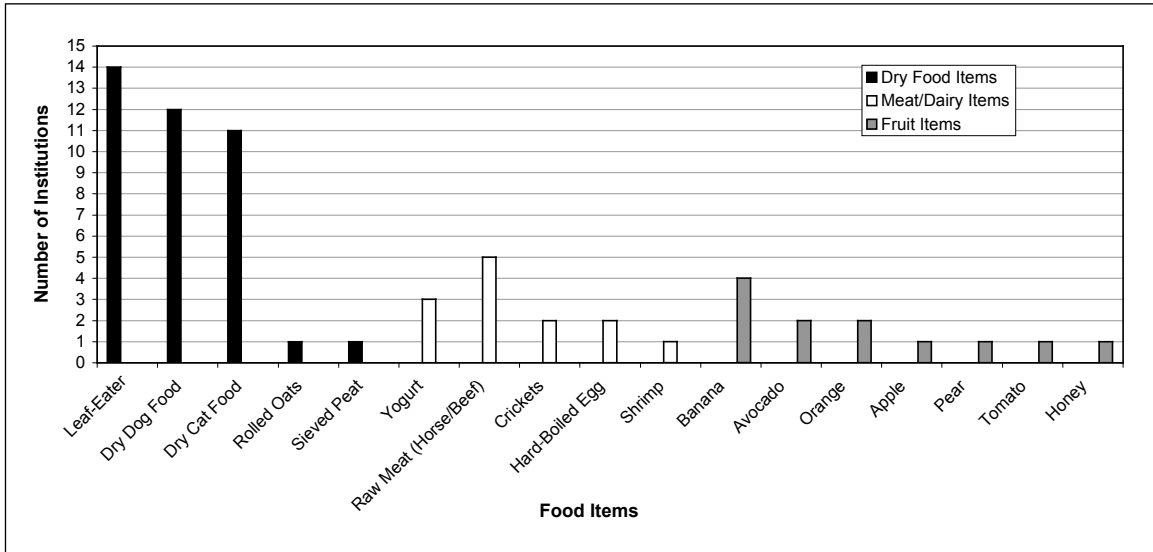


FIGURE 1. Individual food items in giant anteater diet as reported by 21 institutions.

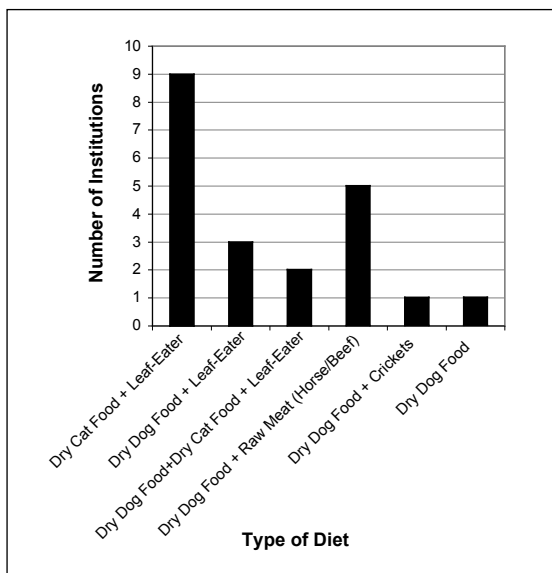


FIGURE 2. Base ingredients combined to form the foundation of each anteater diet type and their frequency of use.

Staple Diets

Figure 2 depicts the base ingredients combined to form the foundation of each anteater diet type and their frequency of use by the 21 responding institutions. As indicated by the graph, the majority of institutions (43%) are using the Leaf-Eater/dry cat food diet formulated by Mark Edwards, Society Nutritionist for the San Diego Zoological Society. Looking at the graph, we see two variations of this

diet used with less frequency, incorporating either dry dog food with Leaf-Eater or dry cat food and dry dog food with Leaf-Eater. Of the 21 respondents, 24% fed the more traditional anteater diet of dry dog food combined with raw horsemeat or raw beef. An interesting note to this graph is the frequency with which dry dog food is used as a base ingredient. About half of the 21 respondents made use of dry dog food either by itself or in combination with Leaf-Eater and dry cat food or with raw meat. Dry dog food is reported to be high in cereal grains, making digestion more difficult for giant anteaters and possibly contributing to a lack of fecal consistency (Edwards, n.d.). Dry cat food has been recommended as a substitute because it is meat-based and thus more easily digestible for the carnivorous anteater (Edwards and Lewandowski, 1996). Unfortunately from the survey data, it is difficult to determine why half of the respondents continue to make use of dry dog food as a dietary base ingredient.

Vitamin and Mineral Supplements

Figure 3 presents the dietary supplements used by the 21 responding institutions. Of the 21 respondents, 38% did not provide any vitamin or mineral supplements to the giant anteater diet. Of these eight institutions, seven were feeding the Leaf-Eater/dry cat food diet. In fact, only

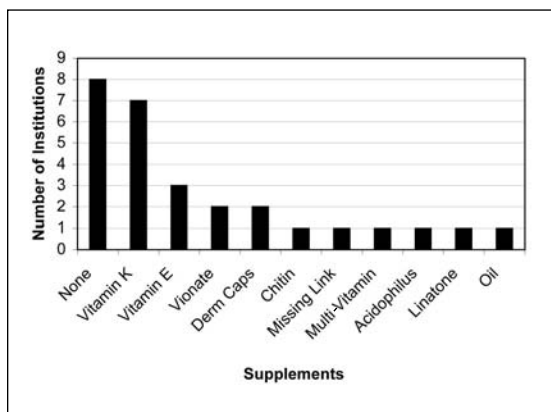


FIGURE 3. Dietary supplements used.

four of the 14 institutions incorporating Leaf-Eater in the anteater diet provided vitamin K as a supplement. According to Mark Edwards, with the Leaf-Eater/dry cat food diet, “all nutrients, including vitamin K, are provided in optimal quantities and ratios to the estimated requirements of these specialist feeders” (Edwards, n.d.). From the survey data, the seven institutions that fed the more traditional anteater diet of either dry dog food or dry dog food with raw meat were more likely to provide additional dietary supplements including vitamin K, vitamin E, Vionate, chitin, Missing Link, or multi-vitamins.

Behavioral enrichment items

Figure 4 portrays a variety of behavioral enrichment items that 20 of the 21 responding institu-

tions provide their giant anteaters on a random basis. The items have been broken down into the following four categories: insects, fruit, objects, and other food items. The three most frequently used items are oranges, avocado, and crickets and bananas tying for third. According to the respondents, the items listed in this graph are not considered part of the staple diet. Instead, they are used as reinforcement for training or as behavioral enrichment tools used to stimulate the animal to explore its enclosure and, in many instances, to promote natural behaviors such as digging or tearing things apart in search of food items.

Summary

The survey results indicate that the captive giant anteater diet is becoming more standardized than it was in the past. From the information provided by the respondents, there is a predominance of three base ingredients used in various combinations with each other to create the staple diet for all the surveyed institutions. The three ingredients consist of Leaf-Eater, dry cat food, and dry dog food. The traditional anteater diet of dry dog food, raw meat, and yogurt no longer appears to be the standard version. Those institutions that phased out raw meat from their diets reported doing so because of the risk of bacteria and parasites such as *Salmonella* occasionally found in raw beef or horsemeat. Several institutions reported

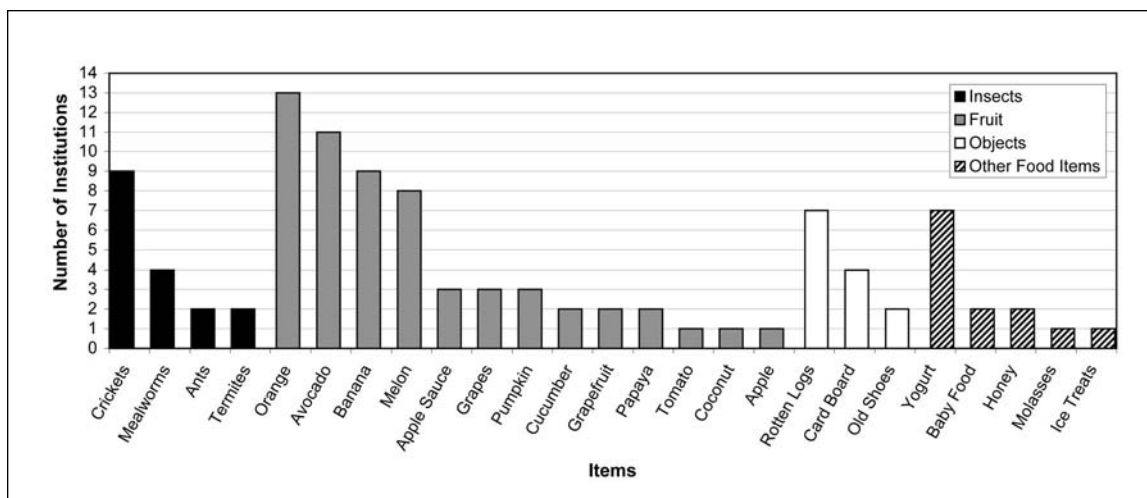


FIGURE 4. Behavioral enrichment items.

either reducing or eliminating the use of yogurt as part of the staple diet because of the possibility of excess lactose from the yogurt increasing moisture levels in the GI tract, thus promoting loose stool. Out of the 21 respondents, only five institutions reported feeding the dry dog food/raw meat diet, and only three institutions continued to incorporate yogurt as part of the daily diet.

The new trend in giant anteater diets seems to be the diet formulated by Mark Edwards consisting of dry cat food and Leaf-Eater mixed together in a one-to-one ratio. This diet was reported by six institutions to have aided in the promotion of increased fecal consistency. Also, the Leaf-Eater/dry cat food diet meets all the nutritional requirements of giant anteaters, including vitamin K, with no need for additional supplementation (Edwards and Lewandowski, 1996). This was evident in the survey data, as those institutions feeding the Leaf-Eater/dry cat food diet tended to use fewer or no vitamin/mineral supplements when compared to the diets not including Leaf-Eater or dry cat food.

One of the challenges in preparing a giant anteater diet is developing a version that can be eaten by an animal that has no teeth and uses its tongue to acquire food. From the survey data provided, 67% of the respondents added enough water to their diets to create an "oatmeal" consistency while 24% chose to liquefy their anteater diets. Only one of the respondents reported feeding their diet (Leaf-Eater/dry cat food) in its dry form after crushing the ingredients into an edible size.

The daily feeding schedule of the 21 respondents varied little; 86% provided the anteater diet twice a day, in the morning and again in the afternoon or evening. From the survey data, 33% of the responding institutions reported monitoring the daily dietary intake of their giant anteaters as best they could. In some instances anteaters shared a diet in the morning, thus making it difficult to accurately record the quantity consumed individually. However, these institutions separated their anteaters overnight and were able to accu-

rately record the individual amount consumed in the evening. As indicated in the "Health Care Survey Results," monitoring daily dietary intake of giant anteaters is the best way to determine the presence and duration of anorexia, a common symptom of some of the larger medical issues giant anteaters may experience in captivity.

Acknowledgments

We would like to take this opportunity to thank the 21 institutions that participated in the Diet Section of the giant anteater survey. Those institutions include: Chaffee Zoological Gardens (Fresno, California); San Francisco Zoological Gardens (San Francisco, California); Santa Barbara Zoological Gardens (Santa Barbara, California); San Diego Zoo (San Diego, California); Jacksonville Zoological Gardens (Jacksonville, Florida); Disney's Animal Kingdom (Lake Buena Vista, Florida); Brevard Zoo (Melbourne, Florida); Honolulu Zoo (Honolulu, Hawaii); Brookfield Zoological Park (Brookfield, Illinois); Rolling Hills Refuge Wildlife Conservation Center (Salina, Kansas); Audubon Park Zoological Gardens (New Orleans, Louisiana); Detroit Zoological Institute (Detroit, Michigan); Cleveland Metroparks Zoo (Cleveland, Ohio); Columbus Zoological Gardens (Columbus, Ohio); Oklahoma City Zoological Gardens (Oklahoma City, Oklahoma); Philadelphia Zoological Gardens (Philadelphia, Pennsylvania); Nashville Zoo (Nashville, Tennessee); Houston Zoological Gardens (Houston, Texas); San Antonio Zoo (San Antonio, Texas); Caldwell Zoo (Tyler, Texas); and London Zoo (London, England). The information provided by these facilities has provided some insight into the different trends of captive giant anteater diets and the reasons behind some of the food choices used, as each institution attempts to provide the best nutrition possible to the anteaters in their collection.

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Crianza Artificial y Manejo Reproductivo de los Tamandú (*Tamandua tetradactyla*) en el Jardín Zoológico de Rosario, Argentina

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Resumen

El 16 de setiembre de 1996, un tamandú (*Tamandua tetradactyla*) huérfano de 735 gramos de peso, extraído de su ambiente natural, fue entregado al Jardín Zoológico Municipal de Rosario, Argentina. Debíó ser estabilizado debido a sus malas condiciones generales; luego se comenzó la crianza artificial del mismo. Más tarde se lo juntó con una hembra de la especie perteneciente a esta Institución para lograr la reproducción. En marzo de 1999 se detectó una posible preñez, y para mayo la hembra abortó una pareja de mellizos. No existe más que una referencia bibliográfica de mellizos para la especie. En este artículo se describen tanto el manejo de crianza artificial como el manejo reproductivo, comparándolo con referencias bibliográficas.

Summary

On 16 September, 1996, an orphan wild lesser anteater (*Tamandua tetradactyla*), weighing 735 grams, was brought to the Rosario Zoo, Argentina. Immediate medical treatment was required because of its poor general condition, and it was then hand-reared. It was subsequently put in with a female lesser anteater for breeding. Pregnancy was suspected in March 1999, but two months later, the female aborted a pair of twin fetuses. Only one reference to a twin birth in *T. tetradactyla* can be found in literature. In

this article, the hand-rearing of this anteater and its reproductive management are described and compared with information in the literature.

Introducción

Los tamandú (*Tamandua* spp.) pertenecen al orden Xenarthra (= Edentata), Infraorden Vermilingua (Glass, 1985; Wetzel, 1985). Se reconocen dos especies, *T. tetradactyla* y *T. mexicana* (Wetzel, 1985). *T. mexicana* se distribuye naturalmente en el extremo sudeste de la meseta mexicana hasta Sudamérica al oeste de los Andes, noroeste de Venezuela y noroeste de Perú. *T. tetradactyla* se encuentra habitando Sudamérica al este de los Andes desde Venezuela hasta Argentina y norte de Uruguay (Wetzel, 1985). Su dieta se basa en termitas y hormigas, variando las especies según la época del año y la disponibilidad. Sus hábitos son crepusculares o nocturnos.

A pesar de que ya en 1854 se registra la presencia de un ejemplar de tamandú en cautiverio en el London Zoo, Reino Unido, tuvieron que pasar más de cien años para lograr el éxito reproductivo de la especie en cautiverio. En el International Zoo Yearbook (1-23) se registraron sólo 4 partos de esta especie entre los años 1959 y 1981, todos ellos en el Lincoln Park Zoo, EEUU (Vogt y Becker, 1987). Hay *et al.* (1994) señalan que desde 1984 y hasta 1994 se registraron 12 nacimientos en cautiverio. En Europa los Zoológicos de Barcelona, España, y Krefeld y Dortmund, en Alemania, los han criado con éxito en los últimos tiempos (C. Enseñat, com. pers.; P. Vogt, com. pers.).

En 1999 en el Jardín Zoológico Municipal de Rosario, Santa Fe, Argentina se registró un aborto de mellizos. En la literatura no figuran éxitos reproductivos para la especie en Argentina.

Crianza artificial

El 16 de setiembre de 1996, llegó al Jardín Zoológico Municipal de Rosario un ejemplar macho de tamandú de manos de un particular