

FINANCIAL ASPECTS OF ZOO DIET MANAGEMENT

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Introduction

Food purchases tend to be one of the greatest expenses, beyond salaries and benefits, for the maintenance of any zoo collection. For this reason, the commissary/food budget is one that receives a lot of attention during the budget planning process. Upon each accreditation inspection, the Association of Zoos and Aquariums (AZA) requires proof of financial stability, including insurance coverage, evidence of financial support that outpaces expenses, and a backup plan in case funding is reduced. However, reviews are made once every five years and details of the commissary portions of the zoo's budget and their purchasing practices are seldom reviewed in detail. Because of this, it is important that each zoo routinely and regularly scrutinize the animal food budget, purchasing practices, and overall diet management/formulation processes to ensure the most prudent use of resources – financial and otherwise.

Diet formulation/Ingredient choices

Appropriate diets can be formulated using a wide variety of ingredients, not necessarily the most or least expensive. For each nutritional need, a variety of ingredient options exist to meet that need, and the selection of one option over another is often a cost-benefit analysis or a risk assessment. The costs (or cost savings) are not necessarily always evident upon first evaluation, and care should be taken to ensure choices meet not only the financial concerns, but more importantly the animal care needs of the animals in question. Remember, “purchasing poor quality food at any price is not only poor nutritional management, but bad economics as well” (Watkins, 1984).

Diet items that are not consumed by the target animals are wasted, in terms of the physical item itself, the nutrients it contains, and the money used to purchase it. There may be a variety of reasons for a food item to not be consumed: poor initial quality, degradation in storage, overfeeding, and/or lack of preference, among others. Avoiding waste, regardless of the cause, is imperative for a financially efficient operation.

The use of nutritionally complete feeds (biscuits, pellets, etc) is often viewed as more expensive than using other items. While this may sometimes be the case, it is often not accurate. On a dry matter basis (water removed from the ingredients), nutritionally complete feeds are often much more cost effective than produce or other items, which may appear comparable on the face of things (Table 1). While nutritionally complete feeds do represent a financial investment, many are formulated to meet specific needs of the animals in question and, with appropriate consumption, can save time and effort in avoiding clinical or sub-clinical metabolic disorders (a cost-savings that is not especially evident or obvious). Evaluation of ingredients and their ability to help meet nutrient needs of the collection is invaluable. Sometimes expensive ingredients have

been maintained on inventory for no practical reason aside from history and, upon evaluation, can be replaced or removed without concern (or even to the benefit of the overall diet).

Table 1. Comparative cost of common nutritionally complete food items and produce (aka – “water is not cheap”).

Ingredient	Cost per Pound, as fed	Cost per Pound, dry matter basis (DMB)
Primate biscuit	\$1.40	\$1.47
ADF-25 pellet	\$0.49	\$0.51
Papaya	\$2.73	\$22.75
Grapes	\$1.76	\$8.80

The use of donated food items or “seconds” can potentially be a cost-effective way to provide diets for collection animals. There are a variety of concerns with this practice in order to ensure the apparent cost savings are real. These concerns focus on evaluating the quality and cost (apparent and hidden), of the ingredients and practices. It is imperative that food items, regardless of source, are evaluated for quality. Items that have passed their expiration date, have detectable signs of degradation, or appear abused should be viewed with caution and likely not included in zoo animal diets (unknown nutrient content, unknown changes associated with degradation/decay, etc.; Henry et al., 2010). In cases where donated produce is considered for use, the increased labor investment in procurement, a quality sort, and trimming may offset the perceived savings in the initial donation. In addition, if the donated items are not ones routinely used in diets, nor can be predictably available over time, the increased labor of determining nutritionally-appropriate substitutions may offset the perceived savings.

Multiple sources of meat and meat mixes are available for use in zoos, across a wide range of cost and quality. Care should be taken to evaluate the quality of the meat or meat product to ensure that it meets the nutrient and sanitation standards necessary for your carnivore collection, and not rely solely on the financial assessment. Again, just because an item is “free” or apparently more cost-effective than another, does not mean that “hidden expenses” do not exist (compromised health and welfare, increased labor, etc). The AZA Nutrition Advisory Group has a cautionary statement regarding the use of roadkill in zoo animal feeding programs (<http://nagonline.net/guidelines-aza-institutions/nag-carcass-feeding-statement/>). Regardless of cost, the use of 3D and 4D meat as a cost-savings measure is not recommended beyond the cautionary statements in the above reference (Crissey et al., 2001). When using larger carcass pieces, it is important to evaluate the product not only in terms of total per pound cost (meat mixes will not include bone weight, but carcass purchase may), but also in terms of total value (which is sometimes abstract) to the collection animal in question. It is often difficult to compare the benefits of carnivore diet ingredients solely on price, when additional animal care considerations (behavioral and/or physiological benefits) exist.

Purchasing Practices and Inventory Management

Not every zoo animal needs to have an individual diet or set of diet ingredients in order to meet their nutritional needs. Diets are expected to meet the nutritional needs of the animal in question (period). This offers some hope to the commissary manager trying to keep their total ingredient inventory reasonable (i.e. not a lot of single use items), at the same time allowing bulk purchase of some feeds in order to save money. Fish, meat, nutritionally complete feeds, and hay, based

on available storage space, can be purchased in bulk to reduce costs associated with shipping smaller loads, or paying the vendor for longer storage times elsewhere. In addition, bulk purchase can allow for better nutritional management (need to sample fewer lots of product), as long as recommended storage times or expiration dates are not exceeded. Care must be taken, however, to ensure that the amounts ordered can be used in a timely fashion, or else the cost savings of a bulk purchase will be lost when the unused or degraded product is discarded. In the case of fish purchases, the biology of the fish species should be considered (i.e. runs and is caught once per year vs. multiple times per year). If the fish species is a once per year catch, timing the purchase for as close to the catch date as possible ensures the freshest product available at the lowest price (once the supply dwindles and/or the product has been in storage longer, the price increases over time). However, based on the prevailing purchasing philosophy of the zoo, and proximity to vendors that provide each individual food item, it may be more cost effective to have less on-hand inventory (money tied up in stored product), sparing funds for other purchases or aspects of the operation.

In certain situations, vendors will allow (or even encourage) a contract to be established for a pre-defined period of time. “Knowing” that the supply of the feed in question has been “secured” can be a benefit in certain situations, but requires an evaluation of the price compared to purchasing off contract. In some situations, the benefit of the guaranteed business may allow for a reduced price from the vendor. In other situations, because the vendor has to account for the possibility of a price increase during the term of the contract, the price may be inflated compared to the current market, to protect the vendor from the uncertainty of the future.

In all cases, whether single purchases, long term historic purchases, or contact purchases, routine price comparisons among qualified vendors are advised. This ensures that any changes in market prices are detected and acted upon to the benefit of the zoo (when possible). In addition, ongoing evaluation of each vendor is advised. Poor customer service (in broad terms – not just returning calls and inquiries, or providing poor quality items upon delivery, but extended/unpredictable periods between order and delivery of product, lack of understanding the mission at hand, etc) can easily increase the cost of otherwise affordably priced items (in terms of labor, communication, follow up).

The decision to grow or raise food items “in house” often appears prudent until labor is considered. Whether growing and harvesting hay/browse, or maintaining a feeder insect, bird, or mammal colony, the costs and benefits should be evaluated continuously. Having supplies of food items that are maintained on zoo grounds can be a benefit to those charged with maintain those supplies, as well as those using them through the facility (potentially minimizes supply chain issues and may or may not reduce cost). Often, the labor invested in maintaining these in house production systems is not considered as part of the “cost.” Labor, in terms of actual real time spent, and in terms of opportunity cost (other tasks not completed during the same time), is not free. In many cases, the infrastructure, equipment, and labor costs easily outstrip the perceived cost savings compared to purchasing the same feeds rather than producing them in house, but this should be critically evaluated prior to initiation and throughout use.

Diet Preparation Plan

The choice of a centralized or decentralized food operation also can have financial ramifications, and the two systems are well detailed in a previous paper (Harris et al., 2013). A centralized diet preparation operation is one in which diets are prepared in a single location. In addition, this location also tends to be the receiving and storage location for many of those feed ingredients. A decentralized operation can include a variety of approaches, but commonly includes diet preparation at a variety of locations throughout the zoo. There are some efficiencies to be gained by centralized diet preparation, especially if diet ingredients are reasonably consistent throughout the animal collection. This could include formulation of common mixes (nutritionally complete feeds, produce, etc), but also could simply include using the same individual item within multiple diets. Because the diets are prepared in a single location in close proximity to the inventory, the labor, equipment, and infrastructure efficiency can be maximized (minimizing cost associated with each aspect). In addition, if the inventory is maintained in a single location, it is much easier to manage and maintain than multiple storage sites throughout the zoo.

Employing a Professional Zoo Nutritionist

Perhaps the single most important thing in managing costs associated with feeding the zoo collection is to have a qualified individual focused solely on providing appropriate zoo animal diets in a cost-effective manner. This goes beyond simply a staff person purchasing the needed items and monitoring inventory. It goes beyond someone selecting the lowest-priced commercial carnivore diet they can find (or the most expensive), without an assessment of quality. It also goes beyond someone entering prices and nutrient contents into a computer program and following the output to offer a “balanced” diet to the collection. It goes beyond a visiting professional making inventory and diet recommendations once per year. It is someone to pay attention to matters at hand on a daily basis to ensure the nutrition needs of the collection are being met in a fiscally responsible way. It is someone trained to understand clinical diet management within the context of the bigger picture. It is someone who can make rational substitutions when certain ingredients aren’t available, both for the good of the animal collection and the financial bottom line. It is someone to assess that an animal is being overfed, based on its condition, behavior, and consumption, and make the educated diet adjustment to not only save the waste, but also improve the health and welfare of the animal in question (also saving the “waist;” Rodriguez and Marques, 2010). Such value, although sometimes very concrete (in terms of cost savings), is also very abstract. Although not simply quantified, the value of a trained, qualified nutritionist on staff cannot be over-stated for all of these reasons and those detailed throughout.

Literature Cited

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