



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

IJDR

International Journal of Development Research

Vol. 11, Issue, 01, pp. 43484-43488, January, 2021

<https://doi.org/10.37118/ijdr.20756.01.2021>



RESEARCH ARTICLE

OPEN ACCESS

FOOD MANAGEMENT OF WILD CATS IN CAPTIVITY

¹Jessica Lucilene Cantarini Buchini and ²Suelen Túlio de Córdova Gobetti

¹Student of Professional Master's Degree in Veterinary Clinics at the State University of Londrina. Londrina, Paraná, Brazil; ²Teacher of the Professional Master's Program in Veterinary Clinics at the State University of Londrina, Londrina, Paraná, Brazil

ARTICLE INFO

Article History:

Received 11th October, 2020
Received in revised form
16th November, 2020
Accepted 23rd December, 2020
Published online 30th January, 2021

Key Words:

Clinical evaluation, Diet,
Felids, Nutrition, Zoo.

*Corresponding author:

Jessica Lucilene Cantarini Buchini,

ABSTRACT

The nutritional requirements of wild animals remain largely unknown, and the use of mathematical models of nutritional requirements of domestic animals is being very useful, as well as information on food constituents, symptoms of excess and deficiency of nutrients and minerals. This work aimed at estimating how the food management of wild cats in Brazil performed. The Research was made through a questionnaire, containing 22 questions available on Google Forms, and sent to zoos in Brazil. The data collected is of the quantitative type whose sampling method used was the non-probabilistic. Of the participating establishments, 24 answered the questionnaire. It concluded that it is still necessary to establish nutritional management standards for wild cats kept in captivity in Brazil, in addition to more investment in food sectors and more incentive to research in this area.

Copyright © 2021 Jessica Lucilene Cantarini Buchini and Suelen Túlio de Córdova Gobetti. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Jessica Lucilene Cantarini Buchini and Suelen Túlio de Córdova Gobetti. "Food management of wild cats in captivity", *International Journal of Development Research*, 11, (01), 43484-43488.

INTRODUCTION

Nutrition is the process by which the animal consumes and processes the nutrients ingested to continue the functioning of its metabolism. In wildlife, catabolism and weight loss are fundamental as a survival strategy for animals, so in captivity it is necessary to evaluate well the need for weight loss. The main objective of nutritional management of wild animals in captivity is the identification of the type of food that the animals consumed in free life, to try to reproduce an environment and food routine to maintain animal welfare. It is also important to consider food acquisition, storage, preparation and supply. It must consider the physiological and psychological needs of the species, and it cannot be reduced to just supplying the food, above all it is necessary to consider the adequate supply of nutrients (Diefereld, 1996). The nutritional condition of animals kept in captivity is fundamental for the conservation of biodiversity, especially aiming at longevity and reproduction (Costa, 2014). In all types of establishments that keep captive animals, adequate feeding and nutrition has been a great challenge, and they are perhaps the main critical point for the success of species

maintenance (Miltão, 2009). Especially in zoos which have existed for thousands of years, the food provided for centuries has been based on diets provided to domestic animals and observations of the feeding habits of wild animals in free life (Costa, 2014). The implementation of a planned nutrition system in modern zoos does not depend only on adequate facilities, qualified personnel or simply the supply of food. The resources available must also be considered in order to make the decision to feed to obtain the best possible result. Planning is fundamental, so it is necessary to know the species, the basic physiology, evaluate the amount of food and costs, and then create a routine that speeds up operations, making better use of human resources and identifying and correcting nutritional metabolic problems (Costa, 2014). The nutritional requirements of wild animals remain largely unknown, and the use of mathematical models of nutritional requirements of domestic animals is being very useful, as well as information on food constituents, symptoms of excess and deficiency of nutrients and minerals (Altrak, 2012). Thus, the objective of this work was to estimate how the different types of food management of wild cats kept in captivity in Brazil performed.

METHODOLOGY

A questionnaire with 22 questions conducted in Google Forms and sent to zoos in Brazil. 24 institutions from the Brazilian states of Acre, Amazonas, Pará, Ceará, Pernambuco, Sergipe, Distrito Federal, Goiás, Minas Gerais, São Paulo, Rio de Janeiro, Paraná, Santa Catarina and Rio Grande do Sul participated in the survey. The data collected is of the quantitative type whose sampling method used was the non-probabilistic

RESULTS

The establishments that participated in the survey remain in captivity: Jaguaritica, *Leopardus pardalis* (21%); OnçaParda, *Puma concolor* (21%); OnçaPintada, *Panthera onca* (20%); Gato-do-mato-pequeno, *Leopardus guttatus* (13%); Jaguarundi, *Puma yagouaroundi* (11%); Gato-maracajá, *Leopardus weidii* (5%); Gato-macambira, *Leopardus tigrinus* (5%); Gato-palheiro, *Leopardus colocolo* (3%) and Gato-do-mato-grande, *Leopardus geoffroyi* (1%). The food that is part of the diet of cats kept in captivity in Brazil described in Table 1 and Figure 1.

Table 1. Composition of the feline diet

Type of Food	Percentage of establishments
Bovine Muscle - Ace, Palette with bone, loin, needle with bone	70%
Bovine heart	65%
Bovine liver	43,50%
Chicken neck	26%
Bovine Kidney	8,50%
Loin, pork leg	8,50%
Pork Heart, Bovine Diaphragm, Forehead with bone, Chicken Thigh and Thigh, Chicken Fillet, Gizzard and Chicken Foot, Diced or Ground Meat, Chicken Egg	4%
Stuck down or frozen	
Whole Chicken	65%
Whole mouse	43,50%
Whole rabbit	17%
Whole mice	26%
Fish (Corimba, Tilapia, Tambaqui)	22%
Chick	13%
Quail	8,50%
Indian pig	4%
Live Tusks (Mouse, Mice, Prairie, Rabbit and Chicken)	4%

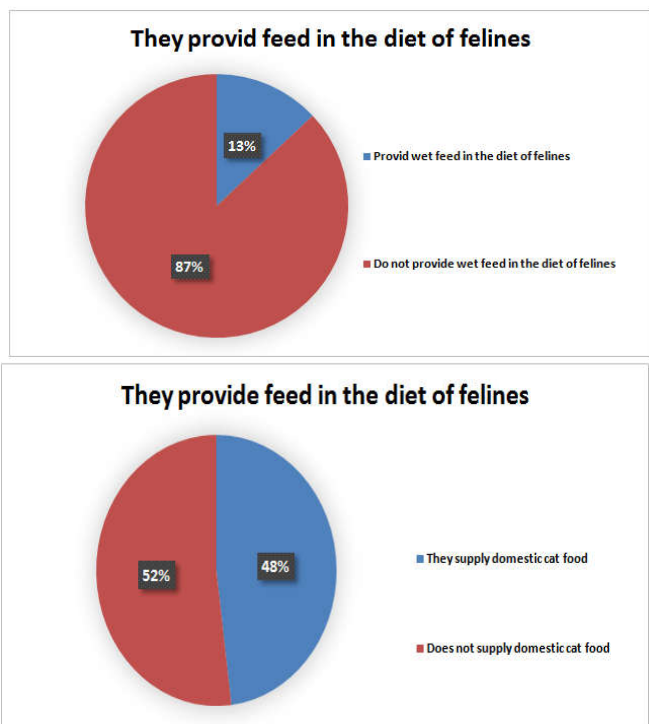


Figure 1. They provide wet feed in the diet of felines

Regarding the whole food supply, 20.83% said they supply once a week; 37.5% supply once or twice a week; 8.33% supply three times a week; 12.5% supply every meal, and 33.33% supply occasionally as part of environmental enrichment (every 15 days, or once a month). Bone supply described in Figure 2. It was verified that 48% of the institutions make clinical evaluation of the animals annually; 26% every three or four months; 13% only when the animals present clinical signs; 9% every 6 months and 4% every 2 years. Five establishments make evaluation periodically, and at intervals when there is need. But the majority say to perform the preventive medicine, in order to reduce the excessive manipulation of the animals.

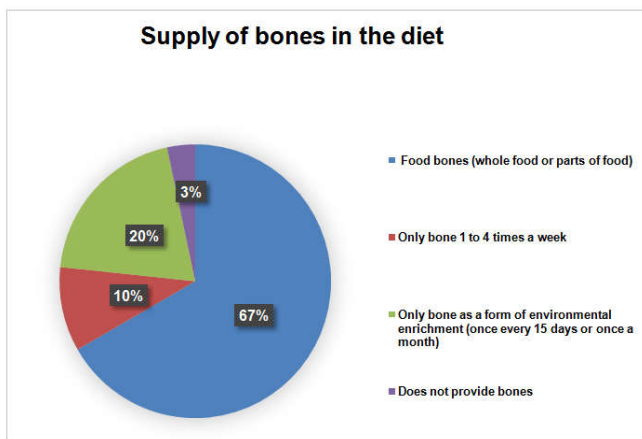


Figure 2. Proportion of establishments that provide this type of food in the diet of cats kept in captivity in Brazil

About the fasting performed in big and small felines, 44% of the establishments fast 24h once a week for big felines, and 17% fast 24h once a week for small felines; 17% fast 24h twice a week for big felines, and 4% fast 24h for small felines; 12% fast 24h three to four times a week for big felines; 17% do not fast 24h for big felines, and 75% do not fast for small felines. In addition, 39% claim do not take into account the diurnal and nocturnal habits of the species, and that food management performed according to the disposition of employees; 61% of establishments said they seek to provide food according to the diurnal and nocturnal habits of the species. About the amount of food provided, 78% of the institutions claimed that regardless of the species offer food once a day; 22% of the institutions consider the species, 15% provide food twice a day for small cats and 7% once a day for large cats. As for the planning of the menu it is made 44% by zootechnicians, 30% by veterinarians and 26% by biologists. To calculate the amount of food, 56% use their own technical manual, assembled from the history of the animals and data from literature, and also use specific software as an auxiliary tool; 39% consult only the literature to assemble the menu, while 4% claim to hire a third-party consulting company. The correction of the diet volume described in Figure 3. In this research it was also verified that 65% of the institutions add

vitamin and mineral supplementation in the diet; 9% said that they add only when it is necessary (clinical treatment situation) and 26% said that they do not add vitamin and mineral supplementation in the animals' diet. It evaluated that 72% of the enterprises that participated of this research make the acquisition of food through the purchase in markets or bidding; 19% have their own production and 9% depends on donations from third parties. Regarding the general expenses of the establishments described in Figure 4.

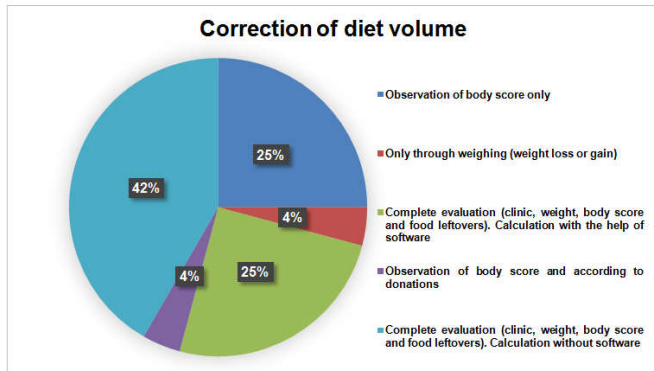


Figure 3. Correction of the volume of the diet of cats kept in captivity in Brazil

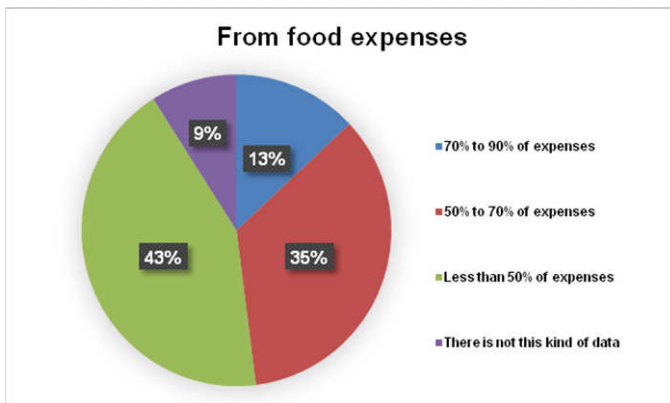


Figure 4. Proportion of food expenses in relation to the general financial management of the establishments

DISCUSSION

The food sector in a zoo, CETA or other enterprise that shelters wild animals in captivity, according to IBAMA's IN N° 15, on April 30th, 2015, must have the adequate facilities and equipment for the preparation of animal feed, have permanent service of attendants, duly trained for the performance of their duties. In addition, the diet must be offered according to the feeding habits of each species. To calculate the animal's diet, it has to be considered the energy requirement depending on the animal's physiological state, it must contain the appropriate nutrients balanced to the species, and finally it must be palatable so that it can actually be consumed. It is important to consider the types of food available, as well as the differences in nutritional requirements according to the times of year (Fnpza, 2016). According to Aza (2016) it is recommended that in addition to the meat mixes, whole prey should be provided, aiming at the welfare and maintenance of hunting behavior. It is also recommended but as food enrichment the supply of bones in the diet, especially in those institutions where the routine of feeding is done most of the time with soft diets. The intention is to make possible not only the animal welfare, but also the maintenance

of oral health due to the abrasion that bones cause in the teeth, thus preventing the accumulation of tartar. It is recommended to be careful with the excessive supply of this type of food, since it is reported the abnormal occurrence of tooth wear, loss of enamel or damage to teeth, even broken and cracked teeth. To choose the most appropriate and effective nutritional approach, it is essential to perform a systematic nutritional assessment of the animals, thus it is possible to identify those who are malnourished, who need immediate intervention, and also the patients in whom nutritional therapy can prevent malnutrition and obesity. Thus, history, physical and laboratory tests are essential to determine the need for nutritional support. Every animal to be evaluated should be weighed and estimated its energetic maintenance need (NEM), in Kcal of metabolizable energy per day (Brunetto et al., 2015). The maintenance energy or maintenance energy requirement is the energy that a moderately active adult animal needs, it takes into account the energy used to digest and absorb the nutrients to maintain body weight. In addition to the basal metabolic energy (MBT), should be considered, this energy is that which is used when the animal is fasting. The animal's energetic demands can be affected by body composition, age, caloric intake and hormonal status (Wortinger, 2016). It is recommended that large cats do not fast more than twice a week, while small cats do not and recommends fasting due to faster metabolism (Aza, 2016). The greatest challenge in the nutritional management of wild animals is to be able to offer the quantities of nutrients needed to maintain the body healthy, especially and specifically the energy. One way to determine these quantities is by calculating the basal metabolic rate (MBR). For most placental mammals, neither lactating nor pregnant, the TMB is represented by: $70 \text{ kcal} \cdot \text{PV}^{0.75}$, where 70 kcal= represents a minimum amount of energy required per kilo of metabolic weight for maintaining basal metabolism, and the $\text{PV}^{0.75}$ is the metabolic weight of animals, calculated from the live body weight without fasting, and high power of 0.75 (Lima & Menezes, 2018).

The energy requirements for carnivores are higher than for omnivores or herbivores, due to the high energy expenditure used for hunting and food handling. The basal metabolic rate (TBM) for jaguar is $67 \text{ kcal/kg} \cdot (\text{PV})^{0.75}/\text{day}$. Studies suggest for an ounce of free life that the TBM is $127 \text{ kcal/kg} \cdot (\text{PV})^{0.75}/\text{day}$, which would be approximately 2x the TBM of an ounce of captivity. The daily need for maintenance of domestic cats is $90 \text{ kcal/kg} \cdot (\text{PV})^{0.75}/\text{day}$, being 1.5x the TBM. Through the extrapolation of domestic cats we suggest $90-110 \text{ kcal/kg} \cdot (\text{PV})^{0.75}/\text{day}$ for wild cats. The indication is $100-127 \text{ kcal/kg} \cdot (\text{PV})^{0.75}/\text{day}$ for jaguar in captivity, but it is always necessary to reevaluate according to the body score and weight of the animal (Aza, 2016). If the animal is elderly it is considered -20% of metabolic energy (Silva, 2018). According to a survey conducted with zoos in Brazil by the Brazilian Small Feline Management Plan, in 2001, coordinated by the Associação Mata Ciliar, the practice of supplying cattle and horses to captive felines was done with run over or sacrificed animals. These carcasses were used and the leftovers frozen to be supplied later. The recommended diet is with a very varied menu based on live or recently slaughtered prey, chicken neck, fish, commercial domestic cat food, calcium and phosphorus supplementation, and some specific amino acids. Premium type pet food is recommended, and well accepted by small cats mainly, and large cats are more resistant to dietary changes (Adania, 2014). According to

Adania (2014) & Aza (2016) the meat diet must be provided from the mixture of beef, chicken and horsemeat, in addition to the supply of bones, whole tusks or carcasses, because only a diet with muscle meat is not complete because the muscle has little calcium, vitamins A, D and E. Therefore it is indicated the use of 5 g of calcium carbonate, 10g of dicalcium phosphate and 1.5g of vitamin minerals for each 2 kg of muscle meat in the diet. It is important that all food supplied comes from establishments that go through an inspection system, in order to guarantee the quality of the product and avoid disease in animals through the consumption of contaminated food (Aza, 2016). Frequently the protein content has been used as a parameter to evaluate the quality of the diet for wild cats in captivity. But it is important that it is not the only parameter used, because the supply of essential amino acids considering the physiology of felines is essential to build the menu of these animals (Dierenfeld, 1996; Coelho et al., 2009; Reche Júnior et al., 2015). As a fundamental point, diet when inadequate can induce health problems, so planning allows preventing the appearance of several problems, improves the quality of life and welfare of animals (Sag, 2016). Therefore, when planning the dietary management, it is important to consider the alimentary habits, the nutritional needs, and what nutrients the food provides to meet the needs of proteins, carbohydrates, vitamins and minerals. The physiological state of the animal such as gestation, lactation and reproduction must be taken into consideration (Militon, 2008).

From the results found in this work it is possible to certify that most of the institutions that participated in this research do not provide such a varied menu to the animals, including different types of meat and whole prey as is recommended by the literature. Chicken meat including chicken neck is the main source of bone supply to cats kept in captivity, while the supply of whole prey is done in a few institutions, which is mainly due to the lack of bioterium in most places. Most of the places provide feed to the animals as a way to keep the diet as complete as possible, although it is recommended that even with the supply of feed the addition of mineral and vitamin supplementation is performed, a considerable portion does not include them in the menu of the animals. Another important point observed in this work is the management of fasting, which is in disagreement with that guided by literature, since most of them do more than 2 fasting per week for big cats and do fasting for small cats. The clinical evaluation as a reference way to correct the diet of the animals is performed at a low frequency, and this is due to the necessary handling of the animals. With this, preventive medicine is sought as a form of evaluation, being the evaluation of the body score visually the most routine way to evaluate the quality of the diet, which can be considered a risk factor, since by detecting that the animal is out of ideal weight, it may have already developed some health problem related to poor nutrition.

Conclusion

It is concluded that it is still necessary to establish nutritional management standards for wild cats kept in captivity in Brazil, in addition to more investment in food sectors and more incentive to research in this area. It is confirmed through this work that it is necessary for institutions to aim at maintaining adequate and balanced feeding for the diversity of animals that are kept in captivity, mainly because the feeding sector is considered one of the most important in an enterprise that

shelters wild animals, since it is through feeding that welfare and quality of life are provided to these animals, and can also directly influence the financial management of the institutions.

Acknowledgment: Acknowledgments the Brazilian Zoo and Aquarium Association - AZAB, for their co-participation in this research project.

REFERENCES

- Adania, C.H., Silva, J.C.R., and Felipe, P.A.N. (2014). Carnivorous – Felidae (Onça, Suçuarana, Jaguatirica e Gato-do-mato). IN: Cubas, Z.S., Silva, J.C.R., and Catão-Dias, J.L. *Wild Animal Treaty: Veterinary Medicine*. 2 ed., São Paulo – SP, Ed. Roca, 2014, 37, p. 864-906.
- Altrak, G. Nutrition and management of wild and exotic animals in zoos. 2012. 49f. Monograph (Degree in Agronomic Engineering) – presented to the Agronomy of the Federal University of Santa Catarina, Florianópolis – SC, 2012.
- Aza - Association of Zoos & Aquariums. Jaguar (Panthera onca): Care Manual. Silver Spring – EUA, 2016, 128p.
- BRASIL. IBAMA Normative Instruction n° 07, on April 30, 2015. Establishes and regulates the categories of use and management of wild fauna in captivity, and defines, within IBAMA, the authorized procedures for the established categories. Official Journal of the Union, Brasília, DF, 11 de may 2015. Available at: < https://www.icmbio.gov.br/cepsul/images/stories/legislacao/Instrucao_normativa/2015/in_ibama_07_2015_institui_categorias_uso_manejo_fauna_silvestre_cativo.pdf>. Access on September 8, 2020.
- Coelho, C.C.G.M., Alvarenga, A.L.N., and Ferreira, W.M. Enzyme deficiencies of domestic cats (*Felis catus*). *Pubvet*, v.3, n.26, art 628, 18p., 2009. Available at: < <http://www.pubvet.com.br/texto.php?id=628>>. Access on July 9, 2020.
- Costa, M.E.L.T. Nutritional Planning. Cubas, Z.S., Silva, J.C.R., and Catão-Dias, J.L. *Wild Animal Treaty: Veterinary Medicine*. 2 ed., São Paulo – SP, Ed. Roca, 2014, cap. 112, p. 2360-2366.
- Brunetto, M.A.; Nogueira, S.P.; Borin-Crivellenti, S. and Crivellenti, L.Z (2015). Nutroly. IN: Crivellenti, L.Z.; Borin-Crivellenti. *Routine cases in Veterinary Medicine of Small Animals*. 2ª ed., São Paulo – SP, Ed. MedVet LTDA, 2015, cap. 14, p. 607-679.
- Dierenfeld, E.S. *Manual de nutrición y dietas para animales silvestres em cautiverio (Ejemplos para animales del tropico americano)*. Bronx – NY, 1996, 99p.
- Fnpza – Fundación Nacional de Paeques e Zoológicos y Acuarios. *Manual de Nutrición para Fauna Silvestre em Cautiverio*. II edición, 180p., 2016.
- Lima, F.C.S. and Menezes, B.B. *Principles of feeding, nutrition and interfering factors in the consumption of diets in captive wild animals*. Scientific Exhibition FAMEZ, Teaching, Research and Extension, XI, 2018, Campo Grande – MS. *Annals...* Scientific Exhibition FAMEZ/UFMS, 7p., 2018. Available at: < <https://famez.ufms.br/files/2015/09/Principios-de-alimenta%C3%87%C3%83O-nutri%C3%87%C3%83O-E-fatores-interferentes-no-consumo-de-dietas-em-animais-silvestres-cativos.pdf>>. Access on September 14, 2019.
- Militão C. *Animal feeding and nutrition*. CEF - Treatment of animals in captivity, 2p., 2008. Available at: < <https://tac9f.files.wordpress.com/2008/11/alimentacao-e-nutricao-de-animais-silvestres.pdf>>. Access on December 21, 2020.
- Reche Júnior, A. and Pimenta, M.M. Cat food: nutritional needs of the carnivore. *Scientific Information: Farmina Vet Research*.

- BragançaPaulista –SP, 4^a ed., 2015. Available at: <https://vetsmart-parsefiles.s3.amazonaws.com/ff53f5ba375781cb93401478079bf1f6_vetsmart_admin_pdf_file.pdf>. Access on July 12, 2020.
- Sag – Ministerio de Agriculture. *Criterios para la manutención y Manejo de Fauna Silvestre em Cautiverio*. Chile, Technical manual, 2016, 100p.
- Silva, M.A. *Evaluation of ocelot diets (Leopardus pardalis) at SargentoPrata Zoo*. 2018. 57f. Monograph (Degree in Zootechny) – presented to Universidade Federal do Ceará, Fortaleza – CE, 2018.
- Wortinger, A. *Nutrition for Dogs and Cats*. 1^a ed., São Paulo – SP, ed. Roca, 2016, 236p.
