So, You Want To Be A Zoo Animal Nutritionist!

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Well, "comparative nutrition" is the name of the game since it is estimated that the zoos of the world house over 3,000 different species [Wilson, 1992]. These include animals as different as snakes and elephants. Your challenge is to devise diets that ensure the proper nourishment of every animal. There is nothing more basic to animal health and welfare.

How do you do that?

There are three things you need to know something about. The first concerns natural dietary habits --- what and how do these animals eat in their natural habitat? The second concerns the anatomy and physiology of the mouth, teeth and digestive system. What foods are the oral cavity and gut designed to accommodate? The third concerns nutrient requirements --- which of nearly 50 nutrients are required in the diet, and how much of each? How do these nutrient requirements change with age, growth, and reproduction?

Where do you get this information?

Field ecologists get information about natural dietary habits by observing animals in the wild. A variety of techniques are used, but the ultimate objective is to learn what items are eaten, how much is eaten of each, and the nutrient contributions that each item makes to the diet. Such studies are difficult to conduct with free ranging species, but they can provide valuable information.

Information about the anatomy of the digestive system is usually obtained after death, at necropsy. Tooth structure indicates whether they are designed for holding and tearing flesh, or whether they are better suited to biting leaves or grinding seeds. The size and complexity of the stomach, the presence or absence of a cecum, and the relative lengths and volumes of the small and large intestines tell much about the suitability of a particular diet. The physiology of the digestive system must be explored with living animals, but a great deal can be inferred from the above anatomical clues.

The need for a particular nutrient (qualitative requirement) can be determined by leaving it out of a diet that is otherwise complete. If no adverse effects are seen, it is not a dietary requirement. Vitamin C is an example of such a nutrient for the laboratory rat, whose tissues can synthesize it. The amount of a nutrient that is needed in the diet (quantitative requirement) is determined by

including it in varying concentrations from low to high. The lowest concentration capable of preventing deficiency signs is termed the minimum dietary requirement. Because so few controlled studies of nutrient requirements have been conducted with zoo animals, it is frequently necessary to extrapolate nutrient needs from studies of domestic species with similar dietary habits and digestive systems.

What education do you need?

To prepare for making nutrition and dietary decisions in consultation with others, it is desirable to have at least a B.S. degree. To make independent decisions, it is desirable to have a M.S. or Ph.D. degree plus experience as an intern or resident nutritionist. Formal coursework in anatomy, physiology, chemistry, biochemistry, physics, statistics, zoology, microbiology, animal science, plant science, animal behavior, ecology, and nutrition is important. Nutrition training should include courses in energy metabolism, carbohydrates and fiber, fats and fatty acids, proteins and amino acids, macro- and trace-mineral elements, and vitamins. Courses in pathology also can be helpful.

What universities offer degrees in zoo animal nutrition?

There are currently no universities in the United States that offer a specific degree in zoo animal nutrition. There are a few, however, which train nutrition students from a comparative perspective. Employment opportunities vary for university graduates, and those who are prepared to make judgements from a foundation in comparative nutrition often are better qualified for zoo nutrition responsibilities than those who have training with only one species. Thus, students are encouraged to contact members of the Comparative Nutrition Society (CNS) or of the Nutrition Advisory Group (NAG) to the American Zoo and Aquarium Association (AZA) for counsel on university programs suitable for their interest.

Where can you get practical experience?

Many (perhaps most) zoos are anxious to encourage the interest of students who, through that interest, may benefit the zoo animal collection. In a number of instances, informal or formal arrangements exist between academic institutions and zoos, providing for cooperative research on the nutritional needs of zoo animals. Several current zoo nutritionists conducted research for their graduate theses in this way. Undergraduate students also have completed projects that qualified as senior theses. Thus, a beneficial training experience was provided, and zoo animals benefited, as well, through an improved understanding of their needs.

What is the future?

There is a great need for qualified zoo animal nutritionists. This is a need that isn't always recognized by zoo administrators, just as the need for zoo

veterinarians was largely ignored until 30 or 40 years ago. The truth is that endangered species may be even more endangered in a zoo where qualified personnel are not in charge of nutrition and dietary husbandry. Fortunately, the need for qualified professionals is slowly becoming apparent to administrators who realize that such professionals bring both conservation and economic benefits to the zoo community. If all zoos that need them were to post positions for comparative nutritionists, there would be a very noticeable shortage of persons prepared to fill those positions. Hopefully, those of you with an interest in this field will seek the training necessary to make a positive difference in the welfare of these wild animals we care so much about.

REFERENCES

Wilson EO. 1992. The Diversity of Life. Cambridge, MA: Harvard University Press.