A bright future ahead

Zoo animal feed is a niche market taken to the extreme, but thanks to the efforts of the recently established European Zoo Nutrition Centre, it is a rapidly developing one. The first hurdle is to establish the requirements of the many different species kept captive in zoos, then to collect and collate the data to re-apply it back into the commercial business of zoos and conservation. Commercial feeds do exist for zoo animals, but the market does still appear to have room for expansion.

By Sarah Mellor

Feeding time for the pelicans at Amsterdam's Artis zoo. Enough is provided to feed all the wild birds too.

The idea to establish the European Zoo Nutrition Centre was spawned in 1999 at the Zoo Nutrition Congress in Prague during a meeting with Rotterdam's Blijdorp Zoo nutritionist Joeke Nijboer and Dr. Walter Jansen, who had recently completed a Ph.D. in horse nutrition and runs a consultancy company specialising in setting up small businesses in niche markets. During the course of the conference discussions, it had emerged that although there was a wealth of information on the nutrition of exotic species, largely built up through experience at individual zoos, there was no means by which that information could be shared to everyone's benefit. However the big issue was time. The pair realised that in combining Nijboer's practical knowledge of zoo nutrition with Jansen's expertise in setting up small business enterprises, they could fulfil that need themselves. However, after six months of deeper investigation into the subject it became apparent that the sheer scale of the project was too great for them to tackle alone. A meeting in Prague in 2000 with Coen Brouwer, director of the European Association of Zoos and Aquaria (EAZA), based in Amsterdam's Artis zoo, proved fateful. Brouwer shared their opinion that there was a need for European zoos to pool resources in nutritional matters. Although congresses already provided one platform for discussions, there was no single collection of data that could be accessed all year round. By the time the 2001 congress came around, the concept was firmly established and Jansen and Nijboer were thrust into the spotlight, attending every relevant event they could, to explain their message and to gain support. Brouwer, by this time had become so convinced of the need for a European zoo nutrition centre to collect and distribute nutritional data, that he offered them free use of an equipped office within EAZA's headquarters in Amsterdam for one day a week for a trial period of one year- beginning in January 2002. Eighteen months on and the centre is still running, having expanded to a staff of four- the two founders and two students. There is no shortage of students willing to do their internship in a zoo, says Jansen. The initial project, collecting information on more than 1200 different diets given to Europe's 5000-6000 exotic species is now complete and the group hopes to have it's long-awaited book of tables and guidelines available in September this year. The same information is already available on the centre's website,

for zoo nutrition

A sound business venture

Dr Walter Jansen is a nutritionist with a strong commercial sense, or could better be described as a businessman with expertise in nutrition. Despite having completed his masters in tropical animal nutrition at the prestigious Wageningen University in the Netherlands in 1989, he found it difficult to find a job in his chosen field and instead embarked on a different path in business. After retraining in marketing and business, he eventually set up his own consultancy, specialising in niche markets for small businesses in agriculture and the feed industry. One of his clients, a Dutch feed manufacturer, inadvertently led Jansen back into animal nutrition.

Advising the client to concentrate on horse feeds as a lucrative niche market, it soon emerged that the client had neither the energy nor enthusiasm for tackling the widened geographical scope of his new market. Where he had previously supplied a wide range of feeds to a very local market, what Jansen was proposing he should do was to supply a more limited range to a more widespread market. Of course this entailed a significant logistical upheaval on the manufacturer's part, so Jansen offered to help out, managing clients as far away as Belgium, Germany and France. Then, a chance meeting with horse nutritionists at the University of Utrecht led him to complete a Ph.D. in horse nutrition. All this while still helping to set up small businesses through his consultancy. Jansen still runs his consulting business four days a week, while retaining one for managing the EZNC.

www.eznc.org, on a subscription-only basis.

Requirements - a mammoth task

Collecting the data was not always easy. The sheer variety of exotic species housed in Europe's 1000 or more zoos is only the first hurdle. The group began by contacting all EAZA's members, a total of 275. However, this is only a fraction of the real total. In the Netherlands alone, for example, there are 12 EAZA members, but there are 52 zoos. Good relations with the Dutch Zoo Foundation, also based in Artis zoo, helped too. Jansen's team found that establishing a contact person within each zoo was integral to retrieving information. "In Europe, there was only one full time nutritionist working in a zoo," says Jansen. That one was Joeke Nijboer at Rotterdam zoo. "Now there are two and one part time, but the main people responsible for nutrition in zoos are the vets and keepers. Conservation biologists also have a role to play, but it is more important for the nutritionist to know about the intake and digestive physiology of the animals rather than what different species of plants they would eat in the wild and how long they spend eating. For example, conservation biologists have made reports on how long a wild giraffe spends browsing on each species of acacia tree, so they can plan how many acacia trees of each species there should be per hectare to support a certain number of giraffes, but they have no data on what weight of acacia leaves a giraffe needs to eat every day. That is what interests the zoo nutritionists and what happens to those leaves one they have been eaten." This it seems is no easy task. In agricultural studies, nutritionists can easily set up a balance trial using large numbers of animals under similar conditions, but with exotic species that just isn't possible. Even if there were enough animals of each species across Europe, the conditions in those zoos, with respect to environmental temperature, humidity and housing can be completely different, for example, between Amsterdam and Barcelona.

Initial calculations of energy and protein requirements to support basal metabolism can be made based on the weight of an animal, but until data can be collected and compared, real science is not as practical in this respect as experience. "Some of the older zoos have built up experience of feeding over perhaps a hundred years," says Jansen, "but even now, for some animals we have no experience. A couple of years ago a consignment of turtles was confiscated in Hong Kong, being exported for consumption. The first problem that nutritionists found was to decide if these turtles are carnivores or herbivores. No one knew. This shows the lack of knowledge in some areas about nutrition for exotic animals." Observing wild animals is not always a practical solution. Furthermore, no one would argue that many of the ingredients used in zoo diets are natural components of the animals' diets in the wild. Lettuce, for instance is by no means available to wild animals, but it is readily available in Europe, so it is widely used in feed. It is therefore common for estimations from different zoos' feeding regimes to differ widely, so Jansen stresses that it is important that users of the EZNC's data must be aware of that and not be surprised, as livestock nutritionists might be.

Comparative nutrition also plays a part. Zebras and camels can be compared to horses; exotic fish to commercial species; bears and wolves to domestic dogs. Primates are usually compared to humans, though some species have digestive physiology more in common with horses. Comparing the similarities and differences in digestive physiology and feeding behaviour brings the zoo nutritionist another step closer to satisfying requirements.

From nutrition to feeding

Excessive feeding of healthy animals is not as much of a problem in zoos as it is with livestock or companion animals. Obesity is rare, though it does occur and excess protein is excreted as long as there are no kidney problems.

The cost of feed is less of an issue in zoos than it is in agricultural livestock production, reflecting both the embryonic condition of the zoo nutrition field and the aims of zoo animal nutrition itself. Obviously, growth rates are not an issue with zoo animals, but longevity and health are. This gives zoo nutrition more in common with companion animal nutrition, though the life spans of most zoo animals are still not well defined. Further in common with companion animal nutrition, feeding treats is an integral part of the equation. Jansen explains that with elephants, for example, including three kilos of carrots in the diet formulation is an insignificant and, in the nutritionist's view, irrelevant as 90% of a carrot is water. However, as Jansen has discovered since embarking on the EZNC project, feeding carrots to elephants is an important part of the bond between keeper and animal- from the keeper's viewpoint. Hence elephants are still fed carrots. In fact, the experience and wisdom of zookeepers is, in the absence of any scientific data to support zoo animal nutrition and feeding practices, vital information and as such is one of the reasons why zoos have little interest in streamlining their feeding costs. One of the other reasons of course is the entertainment value to visitors- whole vegetables are attractive- pelleted feeds and hay is not.

Another challenge is in feeding the right amount. Getting from requirement to diet is not always as simple as it is with farm animals. The pelican enclosure at the Artis zoo is a classic example. Calculation of basal requirements for pelicans would result in a certain weight of fish being given at each feed. In reality, around twice the calculated amount has to be given. This seems excessive without a visit to the pelican enclosure. Artos zoo is happy to allow water and sea birds native to the Netherlands to share the pelican pond, so ducks, herons, gulls and even cormorants can be seen flying overhead and mingling with the exotics. This means feeding time for the pelicans is a veritable feeding frenzy of different species. To make sure the pelicans meet their dietary requirement, enough has to be given to feed the wild birds as well.

Conservation conversations

Now that the dialogue has been opened between zoos on the subject of nutrition, the path is clear to develop its application in other areas of importance to zoos. One of the more important areas is conservation, where the knowledge developed through studying captive animals can be of use in helping maintain wild populations. When the field of zoo nutrition is better developed, Jansen argues, the group will know what questions should be asked of conservation biologists in order to get the information they need to apply that knowledge back from zoos to the wild. Combining this with breeding programmes- already coordinated by EAZAs in Europe to prevent inbreeding in captive specimens- and this knowledge will be essential to ensuring the survival of wild populations of many species. Therefore, accumulating information on nutrition for breeding animals will become an extremely important role of EZNC. Similar to domestic species, vitamin and mineral nutrition will need to be further investigated to improve breeding performance. Another area where EZNC and EAZA are offering a helping hand to conservation is through research.

Although nutrition research is not a major activity in zoos, it can help in some specific situations. The group is currently involved in setting up a collaborative study with the University of Utrecht and the "Apenheul" primate park in the Netherlands to investigate a diabetes mellitus-like disease of woolly monkeys in captivity and in their wild habitat in Brazil. Jansen anticipates that will type of interactive work will become the cornerstone of EZNC's existence alongside the information distribution network.

A rapidly developing market?

Jansen believes, however, as the scientific data becomes more available and more trust is gained between the EZNA and individual zoos, feeds feeding will be increasingly based on the animal's specific needs, but the other feeding parameters will always have to be taken into account. Hence, zoo animal feeds, though as yet underdeveloped, are developing rapidly enough to attract the interest of feed manufacturers. Additives as yet are limited to vitamins and minerals, but knowledge of their application in breeding and lactating animals is an area that should develop rapidly enough by pooling information through the EZNC to improve both knowledge and practice.

For those with an interest in zoo animal nutrition, the final aspect of EZNC's work will involve education. The group is going to begin organising seminars and conferences over the next couple of years, beginning in its home country of the Netherlands and from their it hopes to involve the whole of Europe. ●

More information is available on the European Zoo Nutrition Centre's website: www.eznc.org. The organisation's booklet "ZooAanimal Nutrition: Tables and Guidelines" will be published in September.

"Zoos are as popular as football"

As a commercial enterprise, Walter Jansen believes that zoos have enormous potential and that that potential is often left untapped. "Every year around 10 million people visit zoos in the Netherlands. Also, as you walk round a zoo, you will see that all different types of people visit zoos. Parents take their children, grandparents take their grandchildren, lovers enjoy visiting zoos, so do single people." That is two thirds of the population of the country. Around 14 million people watch Dutch first division football every year. So does this mean that zoo animal nutrition is as important as sports nutrition for professional footballers? For the profitability of zoos as commercial enterprises it would certainly seem that way. Nutrition is also a part of the entertainment and education that zoos provide. This is evident at feeding times, when the best keepers will give the crowds some entertainment, interactive where possible. This means, therefore that what is fed to the animals during these shows is visually appealing as well as nutritious.

However, as financial subsidies are steered away from zoos (80% the funding of Artis zoo, for example, was in the form of a subsidy from Amsterdam local government in the mid 1970's- it has dropped to around 10% today) towards social programmes, the money has to be found elsewhere. With his business consultant hat on, Walter Jansen believes firmly that zoos are, and should be, just like any other enterprise. "There are a lot of things that zoos can do to increase their income", he says. "Once visitors have paid to get into the zoo, you have plenty of opportunity to sell things to them." Food and drink are obvious examples, and help to prolong the amount of time the visitor spends in the zoo, but merchandising is also an opportunity that zoos do not always make the most of. "We would like to do a study to see how long people spend looking at each animal, so we know more about customer activity." Although under the European zoo guidelines, animals are not given a financial value, as they cannot be sold between zoos, only exchanged for breeding, Jansen stresses that some animals are inherently more of an attraction than others so do have financial value in terms of increasing visitor numbers. Using the example of the giant panda, an expensive animal in terms of upkeep: "For permission to keep a giant panda, a zoo has to pay half a million euros each year to the Chinese government for each panda. On top of that, building an enclosure, maintaining it and paying for feed and a member of staff might cost another two hundred thousand, making the yearly cost of keeping the animal as high as 700,000 per year. But experience from zoos that have a panda shows us that it might attract an extra 200,000 visitors each year. At an average entrance fee of 10 per visitor, the zoo could generate 2 million, not including all the extra drinks, snacks and merchandising that could be sold to those visitors." This concept can also be applied to other animals, including active animals like sea lions or chimpanzees or popular animals like elephants and gorillas. Baby animals are also a draw.

So, obviously, feeding is an important part the business of managing a zoo. Even so, most zoos still do not have a specific budget plan for feed. Jansen estimated that he could save 10-20% of a zoo's feed costs by using recommendations based on the information the EZNC has collected and his experience as a nutritionist. However, he admits that no one has, as yet taken him up on his offer. There is obviously still a long way to go before zoo nutrition is as cost-conscious as the livestock sector.

Nutrition is entertainment. Feeding time in the penguin enclosure is a popular attraction with visitors.