

ANNUAL REPORTS

MARWELL ZOOLOGICAL PARK, U.K.

Extracts from the Annual Report 1998

The animal collection (by Peter Bircher)

Over the year, several new species of rodent, fish and invertebrate have been added to the collection – though most of these are not yet on public display. We very much hope to link our new-found interest in small mammals into conservation programmes for endangered species like the European hamster (*Cricetus cricetus*) and the red squirrel (*Sciurus vulgaris*) by offering technical support and facilities to other organisations working in the field with these species. The construction of a display unit dedicated to the captive breeding of small European mammals is planned for 1999. We also plan to open, for Easter 1999, a nocturnal display housing kowari (*Dasyuroides byrnei*), Senegal bush baby (*Galago senegalensis*) and various rodent species.

The arrival of 1.1 Madagascan jumping rats (*Hypogeomys antimena*) from Jersey Zoo has taxed the ingenuity of staff in trying to display this semi-nocturnal creature with our ring-tailed lemurs. An arrangement of plastic pipes buried under a carpet of woodchips and terminating in a small dustbin was constructed to mimic their natural habitat. While at the time of writing the pipes still remain intact, the dustbin has been steadily reduced to a pile of plastic chippings and has been replaced with a wooden box, which is now also in the process of being demolished. Although the rats are nocturnal, they can usually

be seen in the early morning and late afternoon displaying their superb agility.

Several species of invertebrates are now breeding well in our Tropical House, and the survival of several hatchlings of Peruvian fern stick insects (*Oreophoetes peruana*) has been the cause of some excitement, as this colourful insect does not usually thrive in captivity; in fact, we believe that they may be the first hatched in a British zoo. We were also pleased to breed our first four-horned chameleon (*Chamaeleo quadricornis*), though many other eggs failed to hatch for reasons not determined.

Our emperor tamarins (*Saguinus imperator subgriseus*) produced a total of five offspring, of which 1.2 survived, continuing our run of success over the last four years with this delightful species. Five Marwell-born animals were sent to other European collections, as part of the EEP breeding programme for the species.

The most significant addition to our bird collection in the past two years is the colony of African and macaroni penguins. On arrival, the former species were all sub-adult birds and of unknown sex, so we were pleased to observe at the end of 1998 signs of breeding behaviour and the laying of several fertile eggs, which should hatch in early 1999. We very much hope that the birds will incubate and rear their own chicks, but we have set up incubators within the penguin facility as a precaution.

The most significant bird breeding result of the year was the hatching of two Stanley crane (*Anthropoides paradisea*) chicks. This species had

been maintained here for 20 years without any breeding success, despite the exchange of birds with other collections. Following the arrival of our present male from Whipsnade four years ago, some breeding behaviour was observed and several clutches of infertile eggs laid. This year the hen was directly inseminated with semen collected from the ten-year-old male. The following clutch of two eggs were taken away for artificial incubation, both proving to be fertile, though only one chick was subsequently hatched. The hen bird was then inseminated for a second time, resulting in two more fertile eggs, which this time were left with the parent birds to incubate. Once again, one chick hatched and was successfully reared, and one was found dead in shell. The adult birds proved to be exemplary parents and very protective of their progeny. We plan to repeat the insemination in 1999.

The female okapi, Elila, born in March 1997, continued to thrive and is now almost fully grown. She will be transferred to Regents Park some time in the spring, to be paired with a young male who is already in residence. Elila's mother, Bibi, was subsequently re-mated, and a second female calf named Zukisa was born on 26 December; despite being initially cared for by Bibi, she had to be removed after receiving a violent kick when first attempting to suckle. Fortunately, she was only slightly hurt and was readily taking bottle feeds within the first 48 hours of life. The use of artificial colostrum, antibiotics and vitamin therapy seems to have kept her free from any infections. The milk used to rear both calves comes from a local herd of Channel Island cows and is collected direct from the farm every day. One interesting feature of young okapi calves is that, despite taking two to three

litres of milk daily, no faeces are passed until the 45th day of life. This is the cause of much biological speculation, being unique to the species.

A 13-year-old female okapi, Mieke, arrived in February from Bristol Zoo, with the hope of establishing her with our breeding male, Dibaya. This female had been paired with a rather aggressive male some years previously and had developed the habit of lying down on her side when other okapi approached. She was also very nervous of staff and would not allow any physical contact. Over a period of several months, we have managed to gain her confidence and she will now allow keepers to pat and stroke her. Faecal analysis has shown that she is now cycling regularly, but any attempt to introduce the male still results in her lying down. We are now looking at various ways of dealing with this bizarre behaviour. Our second male, Kibali, is now 28 years old and the oldest okapi in captivity.

Sadly, our 15-year-old female pygmy hippopotamus died after a short illness. Post mortem examination revealed a complete lack of body fat, though no significant cause for this could be determined. Fortunately, we were able to import a replacement animal from Antwerp Zoo, and we are hopeful of compatibility with our male, although the initial introduction was not entirely promising.

Our two 11-year-old female white rhinos, Sula and Kiri, are possibly pregnant for the first time. A 14-year-old, Hannu, arrived from Knowsley Safari Park in April 1997, and within a few weeks both females were showing signs of oestrus. A mating with Kiri was subsequently seen, which would give a birth date of around mid-March 1999. Whilst not mating with Sula had been observed, more advanced udder development would suggest that she may have mated at an earlier date. If one or both females

are pregnant, they will produce the first second-generation calves born in this country. [Sula gave birth to a healthy male calf on 8 February. – *Ed.*]

The birth of a female Somali wild ass was a most welcome event and significantly improves our long-term prospects with this now critically endangered equid. Marwell is the only British zoo holding this species.

We are now somewhat concerned about the long-term breeding potential of our Hartmann's mountain zebras, who during the last decade have steadily reduced in number from around 13 animals to seven at the end of this year. Whilst this reduction takes into account animals translocated elsewhere, poor breeding results have prevented natural replacement – only two foals have been born in the last five years. The problem seems to be a combination of non-compatible (aggressive) males and non-cycling females. The reason for this situation is not entirely clear, and the use of hormonal treatments to induce oestrus (or improve the male's libido) have failed to have the desired effect. Whilst we are now trying to locate a replacement male for our group, we may also try to maintain our females without a male for a few months and then reintroduce them in late summer. Interestingly, two of our mares, who are held at the South Lakes Wildlife Park, were observed in season and mated some 24 hours after being introduced to an old stallion, who had previously had a chequered breeding history. This stallion had also rejected and was very aggressive to one of the mares when they were both at Marwell. A blood test carried out on both females suggests that they are pregnant and should foal in the spring. During the last ten years, we have also suffered a serious problem with sarcoid tumours, which occur around

the lower abdomen and often involve the mammary gland. The tumours can become very invasive if they are not treated at an early stage of growth – and, in most cases, surgical removal or freezing usually results in regrowth after a period of remission. The use of a specially formulated experimental cream has shown more promising results and, in the case of one animal, has completely cured the problem.

Field research (by Tim Woodfine)

Field research with Przewalski's horse and black rhinoceros continued throughout 1998. Time constraints meant that some of the work planned with the horses was delayed in favour of working with the rhino, which is considered to be a higher priority. Nevertheless, progress was made with both species.

Field work with Przewalski's horses continued primarily at Eelmoor Marsh. [For the background to this project, see *I.Z.N.* 43:3, pp. 190–192. – *Ed.*] The data collected is helping to build a model of changes in the horses' habitat use and diet selection, not only on a diurnal and seasonal basis, but also over time since initial release into semi-free-ranging conditions. This information is important for our understanding of the horses' ability to learn about and exploit new resources in response to changes in biotic and abiotic conditions.

One of the main focuses of the Przewalski's horse research is to determine the species' requirements for vitamin E. Adequate dietary levels of naturally-occurring vitamin E are important for combating incidences of equine degenerative myeloencephalopathy and other deficiency syndromes suffered by captive wild equids. During 1998, studies were carried out to compare availability of vitamin E in the grasses consumed by animals at three sites representing different management regimes –

Marwell (captive facility), Eelmoor Marsh (semi-reserve) and Pentezug Puszta Steppe Reserve (former range of the wild horse). It appears from this initial work that vitamin E levels may be lower in the zoo paddocks than in the natural grasslands of Eelmoor Marsh and the Hungarian steppe. Although the observed differences may simply be accounted for by natural variations between sites (due to localised environmental factors), it is possible that long-term high-density grazing in the zoo may result in a reduction of sward quality. Further investigations are required to test this hypothesis and to confirm the findings thus far. A database of vitamin E levels from over 200 Przewalski's horse blood samples has now been collected, allowing comparisons between free-ranging and captive animals. This information, together with chemical assays of vegetation samples, should go some way to defining adequate dietary levels of vitamin E for captive wild horses.

Research on black rhino nutrition has by necessity been expanded beyond the original remit of determining vitamin E requirements for the species. While fat-soluble vitamins may play an important role in defending cell membranes from oxygen-free radicals, other studies suggest that black rhino have evolved unique methods of antioxidant defence, and low circulating levels of these nutrients appear to be normal. Of prior concern is direct and indirect evidence implicating mineral and fatty acid imbalances, excesses or deficiencies in captive black rhino. For example, excessive concentrations of calcium and iron measured in black rhino tissues at necropsy may underlie reported cases of hypophosphataemia and haemosiderosis respectively. Essential fatty acids play an important role in maintaining the integrity of erythrocytes and other

cell membranes. As a result, reported fatty acid deficiencies and imbalances in captive diets may be key factors associated with haemolytic anaemia and ulcerative dermatitis.

During 1998, field work was carried out at the Marwell Dambari Field Station and Chipangali Wildlife Orphanage in Zimbabwe. This involved monitoring the intake of fresh browse by black rhino and processing samples for chemical analysis. Simultaneously, blood sampling was undertaken to provide comparisons between the intake of specific nutrients and circulating levels. At the time of writing, results are expected from the laboratories of the University of Zimbabwe in Harare. Comparative work is planned at two U.K. zoos over the coming months, to highlight any nutritional differences between zoo diets and native browse. The methods and protocols developed will also be adopted by other European zoos as part of a global initiative to address rhinoceros nutritional husbandry.

Health problems in captive black rhino and the resulting need for further nutritional assessments are of global concern. Conservation strategy for the species incorporates *ex situ* captive breeding by the international zoo community and translocations of individuals between free-ranging sites within their native range. As well as the obvious need to develop adequate zoo diets, there are also nutritional problems being encountered when moving wild black rhino from one habitat type to another. As information gained from *in situ* studies is of vital importance for our efforts to maintain captive animals, future research may be aimed in this direction. To this end, discussions have been initiated with the Wildlife Unit of the Zimbabwean Government Veterinary Department to engage in collaborative research.