

THE BIOLOGY AND MANAGEMENT OF MOUNTAIN UNGULATES

Edited by

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Problems in the Management of Chamois in Captivity

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Abstract

Practical advice is given for the husbandry and management of chamois in captivity. The most common diseases and their treatment are discussed. The dosages of three drugs for a safe capture are reported.

Introduction

In Munich Zoo there is a long tradition, dating back in fact to its founding in 1928, of keeping chamois and other mountain ungulates, e.g. markhor, Nubian and alpine ibex, wild goats. Whereas the Caprinae sub-family is quite common in wild animal parks and zoos and their reproduction rate appears to be quite satisfactory everywhere, markhors and especially chamois are much more sensitive and difficult to manage. This may account for the fact that one rarely finds prosperous colonies of these species in captivity. At the time of writing, we have 11.11 markhors and 5.13 chamois in our collection, i.e. according to the International Zoo Yearbook, the biggest herds of either species in captivity the world over. The process of building up such complete colonies of high mountain ungulates was as stony and difficult as any one of these magnificent animals' biotopes. As the problems of nutrition, husbandry, management and diseases are, to a great extent, common to both species, I would like

to summarise our experiences in this field and make some practical recommendations about the keeping of for example chamois.

General Management and Nutrition

One of the nastiest problems for mountain ungulates in captivity seems to be the overgrowing of hooves. Uncorrected hooves often result in malposition of joints and hypertension of tendons and ligaments which can then be irreversibly damaged. Using the old type of ordinary concrete enclosures, we had to trim hooves twice a year. Six years ago, however, we introduced a much more suitable surface for chamois, consisting of a thin layer of gravel with large areas of grass. As the gravel is sharp and rolls on the ground, the chamois' hooves are bound to get scraped and we have not had to trim them since then.

The surface area of our enclosure is ca. 4,240 m²; the surrounding fence is 2 m high.

In captivity chamois can become very aggressive towards each other and behavioural interactions are very common. The dominant buck only tolerates young males until they reach the age of sexual maturation. Even between females, severe, aggressive interactions with regard to order of precedence can sometimes occur with fatal results. Therefore the structure of the surface of the compound should be formed in such a way that subordinate animals can easily hide from those holding a higher rank, when necessary. This can be achieved simply by adding rocks, a dry moat, trees or smaller hills. All the births in Hellabrunn Zoo occurred away from the visitors, behind a little range of hills, and during the first few days, the newborn kids could lie down with the protection of these hills. During the rutting season, the buck can become very harassing towards an individual female and chase her until she reaches the point of exhaustion. To avoid losses from this, we keep the female in a neighbouring enclosure for several days and test the buck's reaction daily. When the female seems to be fully oestrous, we bring her back to the herd and, in most cases, she is accepted again by the male. Normally mating occurs soon afterwards. On the other hand, when an individual female has once been attacked by several other females, reintroduction into the group has always been impos-

sible and we have had to sell the animal. The reason for this behaviour between animals which have been together for several years, is unknown. In any case of handling, separating or driving the animals, we must always remember that chamois are very sensitive to stress and inclined to panic reactions, with a shock syndrome. Food should be available in several places to reduce competition at feeding and fresh portions given twice a day. Chamois are selective eaters and prefer branches, leaves and shoots. In the wintertime, we strongly recommend a daily provision of branches to provide the chamois with bark. Hay must be of first class quality and provided *ad libitum*. The average daily ration per animal has been set out in Table 25.1. Salt stones should always be available. The average body weight of our adults varies between 30 and 40 kg, indicating that they are in good condition and that their feeding is adequate.

Bacterial Infections

The greatest problem we had with our chamois was peracute septicaemia in kids during the first four weeks of life. The clinical symptoms were high temperature (41.5°C), convulsions and peracute death within a few hours. The mortality rate was very high: between 80 and 100 per cent. All the usual treatment proved useless. *Escherichia coli* strains 0.8, 086, 0117, could be isolated in all organs. Since 1975 we have vaccinated all our mountain ungulate kids with an oral vaccine (Baljer, 1975) produced from isolated bacteria strains taken from our dead young animals. This 'herd-specific' vaccine must be administered daily for the first 10 days of life. We built a special neighbouring enclosure for catching the young in order to avoid unnecessary stress during the capture. The effect of this vaccination has been excellent and has reduced the mortality in kids from colisepticaemia to zero.

In the years 1976/77, we suffered some losses of 6- and 13-year-old chamois due to acute bronchopneumonia caused by *Pasteurella multocida*; for several weeks previously, the animals had seemed to be in bad condition and had been separated from the herd. At the time we assumed that the nutrition was not suitable. Furthermore, this was probably the cause of various outbreaks of enterotoxaemia, and in a single case, of *Clostridium*

Table 25.1: Daily Food Ration for Chamois

<i>Summer:</i>	grass <i>ad libitum</i>	
	500 g pellets*	
	50 g mineral and trace element mixture	
	100 g concentrate**	
	500-1,000 g hay	
	no fruit	
<i>Winter:</i>	500-1,000 g corn silage	
	500 g hay	
	500 g brewers grains, dried	
	500 g pellets*	
	50 g mineral and trace element mixture	
	100 g concentrate**	
	<i>*pellets consisting of:</i>	<i>**concentrate consisting of:</i>
	25.00% oat	20% soy bean meal
	21.00% barley	30% maize
	16.00% soy bean meal	40% oat, crushed
	10.00% wheat bran	2% brewers yeast
	6.00% alfalfa	2% linseed expeller
	6.00% molasses	6% dried sugar beet pulp
	5.00% wheat	
	4.00% coconut cake	100%
	2.00% linseed cake	
	1.50% dicalcium phosphate	
	1.00% calcium carbonate	
	0.55% salt	
	1.95% vitamin-premis I.U.	
	100.00%	
	<i>Vitamins:</i> 47.000 I.E. Vitamin A	
	5.600 I.E. Vitamin D ₃	
	312 mg Vitamin E	

septicum infection. We performed a vaccination twice a year by blowpipe with a polyvalent *Clostridium* vaccine (Covexin 8, Burroughs & Wellcome) over a period of two years. Since 1977 we have kept the animals in a larger enclosure, we have not repeated the vaccination and there have been no more instances of *Clostridium* infections. We think that the improvement in surroundings and more suitable nourishment has prevented any further outbreak of this polyfactorial disease.

Viral Infections

In 1977 we had an outbreak of an *Ecthyma contagiosa*-like syndrome after importing 0.2 animals from an animal park in Switzerland. Mostly kids of 2-3 months of age became heavily infected.

The first symptoms were only some grass blades sticking out at the lips. The lips were swollen with rhagades and bloody crusts around the mouth. A virus from the Papillon-Polyoma complex was suspected of being the cause but isolation of the virus was not possible. The lesions had been superinfected by *Staphylococcus aureus*. Treatment with antibiotics and daily washing with 0.2 per cent solution of hexachlorcyclohexan was effective.

Parasites

In all our mountain ungulates residual infestations of Strongylids like *Ostertagia*, *Trichostrongylus*, *Haemonchus*, *Chabertia*, *Oesophagostomum* and of *Capillaria*, *Trichuris* and lung worms (*Cystocaulus*, *Protostrongylus*, *Muellerius* and *Neostrongylus*) occur regularly. We control them by feeding 500 p.p.m. Mebendazole over a period of 2 weeks twice a year (Forstner, Kopp & Wiesner, 1977). In addition all our kids are dewormed by a regular injection of L-Levamisol 2-3 times during the first 8 months of life (Wiesner, 1975). With these precautions helminths are no longer a problem in keeping chamois.

On the other hand, coccidiosis is still a big problem with all high mountain ungulates (*Eimeria alpina*, *E. riedmülleri*, *E. rupicaprae*, *E. yakimoff-matschoulskyi*). Although these parasites are known as a specifically young animal disease in domestic stock, we even lost some chamois of more than 10 years of age from coccidiosis, after a stress situation. There is particular danger to kids from 8 weeks to 1 year old, as they become affected by severe diarrhoea. Severe electrolyte deficiency may provoke typical oedema in the throat region. Without treatment, the kids die within a few days. We have developed two therapeutic schedules for the treatment. In cases of an acute form of coccidiosis we give 2-5 g Socratyl-R (sulphathiazole plus formaldehyde) daily by throat tube for 3-5 consecutive days, with an additional dose of Theracanzan-R (sulphadimethoxin) (2-4 ml) per kid.

We did not get good results with the Amprolium 40 mg/kg for 14 days, sometimes recommended as a preventive measure. In our own field trials since 1975, we have found that 100 p.p.m. Monensin for 3 weeks is the best preventive treatment for coccidiosis in all mountain ungulates. By administering this treatment two or three times a year depending on the oocyst occurrence in the faeces, we have had no more clinical symptoms of coccidiosis in our kids or losses from this disease. The excretion of oocysts decreases considerably, although some oocysts are always found in normally formed stools. Chamois do not accept a higher dose in their food. Monensin is known to be toxic in the equine family and too high a dosage has produced cardiomyopathy in deer (Amend *et al.*, 1980; Glover & Wobeser, 1983). With a dosage of 100 p.p.m. Monensin no side effects were observed in our chamois or in other mountain ungulates. This preventive treatment for coccidiosis and the oral vaccination against colisepticaemia seem to be the key to keeping a prosperous colony of chamois in captivity.

Immobilisation

Chamois are very sensitive to any kind of immobilisation and need on average much less drug dosage than other ungulates. Safe and efficient immobilisations in over 60 chamois were performed in Munich with the following combinations:

1. 'Hellabrunner mixture' (i.e. 125 mg Xylazin + 100 mg Ketamin per ml) (Wiesner, 1977): *subadult*: 0.04 ml in total; *adult*: 0.08 ml in total.
2. Immobilon® (*large animals*): 0.8 ml/adult animal (Wiesner, Rietschel & Gatesman, 1982)
3. 400 µg Carfentanyl + 2 mg Xylazin/adult animal (Wiesner *et al.*, in preparation).

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