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The care, management and display of prairie dogs

Cynomys spp

in captivity

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The popularity of outdoor prairie dog *Cynomys* spp exhibits in zoos is well established. All species are hardy and easily maintained under semi-natural conditions where they can burrow and carry out their above-ground activities in full view of the public. Prairie dogs often breed under these conditions but the minimum requirements that promote breeding and ensure self-perpetuating colonies are not well established. The ease with which replacements can be obtained has not encouraged critical evaluation of management practices. Prairie dog pens are often overcrowded and little or no attempt is made to systematically rotate stock or to control age and sex ratios. Most species of *Cynomys*, including the formerly abundant Black-tailed prairie dog *C. ludovicianus* have declined in numbers (7) making the need for developing captive breeding programmes urgent. Zoos should give more thought to breeding even commonplace species if they intend to establish credibility as producers rather than consumers of wildlife.

This report offers suggestions for managing prairie dogs in outdoor enclosures on a sustained-yield basis and calls attention to some educational possibilities for prairie dog exhibits.

ENCLOSURES

Crandall (1) described outdoor pens used for prairie dogs at the New York (Bronx) Zoo and outlined some of their basic requirements in captivity. The most important consideration, at least for zoos in the more northern latitudes, was a well drained location that permitted the animals to burrow below the frost line. A cement or other type of barrier extending from just above ground to 1.8 m below the surface usually prevented the animals from tunnelling out. Zoos in lower latitudes with no frost problems and high water tables might require less extensive protection. For example, *Cynomys* burrows excavated by Whitehead (9) in Texas extended a maximum of 1 m below the surface (many were shallower); some tunnel systems contained emergency nest chambers only 30 cm beneath the surface to which the animals apparently retreated when the water table temporarily rose above the normal 1.25 m level. Perimeter fences or moats must include the usual safeguards against escape.

Although few zoos can afford this luxury, an 'ideal' prairie dog enclosure should contain at least 2000 m² of sodded, fairly level ground. The type of pasture grass which is planted will

depend on the region; clover should be included if possible. Small openings connected by narrow alleys of bare ground 60 to 90 cm in width will encourage the growth of weeds and other herbaceous primary invaders relished by prairie dogs. The monotony of an apparently featureless landscape can be made more attractive by adding a few scattered clumps of yucca, opuntia or shrubs unpalatable to *Cynomys* and several low rock piles. Utah prairie dogs *C. parvidens* at the National Zoo regularly used their rock pile as a lookout perch.

IDENTIFICATION

Marking methods suitable for prairie dogs are toe clipping, dyeing, tattooing and branding. Each method has advantages as well as limitations.

Because prairie dogs seldom lose toes accidentally, toe clipping is reliable for permanent identification and accurate inventory control. The numbering system adopted should not require the removal of more than one toe per foot. The animals must usually be handled for identification and toe amputation can result in excessive bleeding, particularly if the animal is overstressed (4; 7).

Coloured dyes (Nyanzol A) are excellent for temporarily marking small animals that need to be recognized from a distance. Various colours or colour combinations applied to different body areas will distinguish sexes, clans, or individual members of clans. Dye marks for adults must be renewed twice a year following each moult. Dye marking of juveniles should be delayed for three or four weeks after they appear above ground and maturation moults have been completed.

Branding can be done with chemicals (7) or by freeze-drying (2; 3) after shaving the area of application. Animals marked with chemical brands must usually be caught to be identified, but freeze-branding produces a contrasting permanent white marking visible at a distance.

Commercially available freeze-branding equipment is too large for prairie dogs, but a branding iron can be improvised from a 5 cm length of 4×4 cm copper bar stock tooled to form a branding surface 2·8×0·6 cm and attached to a dowel handle (2). Freeze-dry brands conspicuous enough to be recognized from a distance permanently alter the animal's appearance and might raise objections from the public regardless of the explanation. But green-headed or pink-rumped prairie dogs could cause the same reactions.

Tattooing is not a satisfactory method for marking densely furred small mammals. Parting the fur to reveal the numbers or symbols even on the relatively sparsely furred inner thighs of animals like ground squirrels makes reading the marks difficult and subject to error. Free-hand lettering of legible symbols or numbers requires an expertise which may be unavailable.

GROUP STRUCTURE

The basic social unit or coterie (clan) in a Black-tailed prairie dog colony studied by King (4) contained an average of 8·5 individuals (range 2 to 35) that occupied territories averaging 2830 m² (range 1620 to 3720 m²). The mean number of animals per age class and sex was 1·65 adult ♂♂, 2·45 adult ♀♀, 3·57 immature ♂♂ and 2·36 immature ♀♀. Unless there are special reasons for duplicating this age structure, the number of immatures in a captive colony should be based on a stock rotation plan. Presumably a properly watered and fertilized pasture will support more prairie dogs per m² than most natural habitats, so a coterie consisting of two or three ♂♂ and 12 to 15 ♀♀ per 1000 m² is acceptable. Females with nursing young and occasionally old ♂♂ may defend burrows but usually there is little intergroup territorialism or social hierarchy in either white-tailed or black-tailed species. However, animals used to start new colonies should be introduced simultaneously as a group. Established

coterries will not always accept newcomers. Single animals may be especially subject to attack and injury.

BREEDING STOCK ROTATION

Prairie dogs have lived up to 8½ years in captivity (10) but studies in the wild suggest that few survive longer than five years, with ♀♀ living longer than ♂♂ (4). Stockard (8) thought *Cynomys leucurus* did not breed until they were two years old; King (4) came to the same conclusions for *C. ludovicianus*, but according to Longhurst (6) yearling ♀ *C. gunnisoni* were capable of breeding. Age of senility is unknown for any species.

Assuming that puberty occurs at two years and the maximum breeding age is five years, breeding stock rotation for captive ♀ prairie dogs should be geared for a complete turnover every five years. Ideally this requires five age classes with about the same number of animals in each class. The number of young of the year retained should equal the number of animals culled each year. Based on their shorter average life span, turnover in ♂♂ should be every three or four years. Allowances must also be made for replacing nonbreeders and animals that die before replacement age.

For white-tailed species (*C. leucurus*, *C. parvidens* and *C. gunnisoni*) the annual selection and marking of replacement animals and culling of animals should be done between mid-April, when young first appear above ground, and the third week in June or before adults begin aestivating. Black-tailed prairie dogs can be selected and culled anytime while the young can still be distinguished from adults.

EDUCATION POSSIBILITIES

A properly managed exhibit combined with graphics and well designed visual aids will promote visitor interest in the most commonplace animals. The world of the prairie dog is no exception and offers endless possibilities for illustrating ecological principles, animal inter-

relationships, social behaviour and the impact of man's activity on animal species.

A chronology dealing with the past, present and future of the prairie dog in its native habitat makes a fascinating although depressing story. It might begin with a description of the pristine reciprocal ecological relation between bison *Bison bison* and Black-tailed prairie dog (5) that lasted for thousands of years and tended to maintain the short grass interspaced with patches of forbs and bare ground which was ideal for both. The next event of significance was the sudden almost total extermination of the bison by the late 19th century that abruptly ended this relationship between one of the smallest and the largest herbivores of the Great Plains before much was really understood about it. The decline of the bison apparently caused the disappearance of prairie dogs in some areas because of the resulting unfavourable plant succession but no actual measurements of these decreases were obtained. While prairie dogs were still numerous, agricultural development of the short grass prairie brought them into a three-way conflict with man and his livestock that has continued to the present day. Poison campaigns and other control activities initiated in the early 20th century were fully implemented by about 1920 under Federal agencies. These programmes of extermination were so effective that the Black-tailed prairie dog is no longer classified as a serious agricultural pest. The policy has now been changed to control rather than extermination but remaining prairie dog populations outside State and National Parks are still under pressure. The story could be concluded by mentioning the effects of prairie dog control measures on the continued decline of one of North America's rarest mammals, the Black-footed ferret *Mustela nigripes*. A footnote concerning conflicting goals of government agencies might be added. Maps showing present and past distribution of

prairie dogs and the locations of National and State parks containing these animals would complete the graphic displays. The prairie dog's story is worth telling because it was and is an integral part of the history of the settlement of the midwestern United States.

The life history of the white-tailed prairie dog makes an interesting topic for graphic interpretation. One could list the following events in chronological order:

- (1) the time of the year the animals emerge from hibernation;
- (2) when they breed;
- (3) when the young are born;
- (4) how old they are when they first appear above ground;
- (5) when adults begin aestivation;
- (6) when young of the year begin aestivation.

Additional information on maturation and annual moults could also be included.

Adjacent exhibits of Black-tailed and white-tailed prairie dogs offer unlimited opportunities for contrasting and comparing their lifestyle, ecology, behaviour and appearance. A mixed species exhibit containing prairie dogs, bison and Burrowing owls *Speotyto cunicularia* would also be interesting.

PRODUCT MENTIONED IN THE TEXT

Nyanzol A: colour dye manufactured by Nyanza Color & Chemical Co., 109-111 Worth Street, New York, NY, USA.

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