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NOTES

ABNORMAL JUVENILE PELAGES AND ESTIVATION IN THE UTAH PRAIRIE DOG, *CYNOMYS PARVIDENS*.—Belatedly given status as a rare and endangered mammal (U. S. Dept. Interior 1966), the Utah prairie dog, *Cynomys parvidens*, was almost exterminated by ill-advised rodent control programs before much was known about its biology. Although *C. parvidens* and the white-tailed prairie dog, *C. leucerus* are closely allied, both are recognized as species on the basis

of nonintegrading morphological differences (Hollister 1916; Durrant 1952), allopatric distributions (Kelson 1951), and karylogical and electrophoretic data (Pizzimenti and Nadler 1972).

Little has been written about juvenile pelages and maturation molts in *Cynomys*. The abnormally colored juvenile pelages and their subsequent replacement by normal adult fur as reported herein is apparently unique. The behavioral adaptations described seem to further characterize the extent to which the Utah prairie dog has responded to its present environment and isolation.

The Utah prairie dog has been exhibited in semi-captivity at the National Zoological Park since 1971 when two males and four females captured near Cedar City, Utah, arrived. My descriptions are based on the study of live animals and a series of 35 mm color slides.

No evidence of breeding was noted until mid-April 1973, when I saw an obviously nursing female. On 13 May, four young approximately one-fourth grown were noted above ground for the first time. Seen from a distance of 15 or 20 ft, all appeared so uniformly white in color that I thought they were albinos. Closer examination revealed their eyes were black and the pelage had a slightly grayish cast from certain angles. Changes in their appearance and size came with remarkable swiftness. Thirty-five days after their debut, the juvenals had molted twice and were about two-thirds grown.

Replacement of the whitish, soft textured juvenal pelage by a slightly darker, buffy-tan postjuvenile pelage began about 18 May. Molting started on top of the head and spread rapidly down the neck, shoulders, back, sides and hips and was completed, at least dorsally, by 30 May when the animals were approximately half grown. Young postjuvenile pelage still bore no resemblance to adults and lacked any trace of the blackish-brown eyebrow and cheek markings.

The second molt began 3 June and was completed about 18 June. Sequentially it reversed the previous molt and its completion resulted in fur identical to freshly renewed adult summer pelage. Progress of this molt was easily followed because of the dissimilarity in both color and texture between the two pelages. It first became noticeable on the rump and spread anteriorly and laterally. The heads were last to change and animals in final stages of this molt were especially conspicuous.

Lacking reasons for suspecting nutritional deficiencies, a genetic explanation for this color anomaly seemed the most logical. But literature, including Searle's (1968) summary, contained no examples of mutations in mammals effecting the color of juvenile pelage that was not carried through to some degree in the adult pelage.

A litter of four born in 1974 (to different parents than those of the 1973 litter) were all normal colored. As in other species of *Cynomys*, they were, except for fur texture and slight differences in tone, miniatures of the adults; tails were buff-colored instead of white as in adults.

The father of the 1973 litter died making it now impossible to breed other litters with the same parentage.

True hibernation in *Cynomys* is suspected but to my knowledge unproven. Severe winter conditions at higher elevations and in places like the northern Great Plains enforces dormancy and otherwise limits the activities of prairie dogs. Where it does occur, winter feeding is much reduced, and varies from region to region (Koford 1958). *Cynomys* does not store food.

Although the white-tailed prairie dog is reported to estivate in Wyoming (Stockard 1930), I was reluctant to consider this as a possible explanation for the disappear-

ance of the Utah prairie dogs their first summer in 1971. By mid-July, adult activity ceased completely, burrow entrances deteriorated, and the food remained untouched. After no animals were seen for several months, I concluded that *C. parvidens* either failed to adapt to captivity or the Washington, D. C. climate was too unfavorable, and all had succumbed underground. It came as a surprise when the animals began to reappear in early January 1972 and all were active by 10 March.

The same schedule was repeated in 1972, 1973 and 1974. Old males retired first followed by nonbreeding females. In 1973, the breeding female was the last adult to become fat and commence the gathering of nest material that precedes estivation. The young born in 1973 were above ground until the first week of September. The last adult was seen 2 July of that year. One of the young gathered nest material 5 July. The zoo's previous colony of black-tailed prairie dogs, *C. ludovicianus*, were active year-long in the same enclosure.

Comparable adaptations enable the Townsend ground squirrel, *Spermophilus townsendii* (Hall 1946) and the Mohave ground squirrel, *S. mohaviensis* (Bartholomew and Hudson 1960) to inhabit arid environments. Both emerge from dormancy in midwinter, breed and give birth before midspring. They take advantage of green vegetation available in spring and early summer, become fat by the beginning of hot weather and estivate or combine estivation with hibernation and stay underground until the following January or February. Five to six months of activity followed by six to seven months of rest summarizes their annual cycle. The succulent greens they prefer cannot be stored, so fat supplies their energy during dormancy. The semi-arid nature of much of the habitat occupied by the Utah prairie dogs would favor the evolvement of similar mechanisms by them to evade heat, drought and summer food shortages. Field studies are needed to corroborate my findings in captive animals.

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