Cynomys leucurus. By Tim W. Clark, Robert S. Hoffmann, and Charles F. Nadler
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Cynomys Rafinesque, 1817
Cynomys Rafinesque, 1817:45. Type species Cynomys socialis Rafinesque [= Cynomys ludovicianus], by original designation.


1. Tail tipped with black __________________________ (Cynomys) 2
Tail tipped and bordered with white __________________________ (Leucocrosaurus) 3

2 (1) Black on tail covering most of distal half; posterior border of inflected angle of mandible nearly at right angle to axis of jaw __________ C. mexicanus
Black on tail confined to distal third; posterior border of inflected angle of mandible at angle of about 45° to axis of jaw __________ C. ludovicianus

3 (1) Terminal half of tail with gray center, bordered and tipped with white __________________________ C. gunnisoni
Terminal half of tail white, without dark center ______ 4

4 (3) Color in summer reddish or rich cinnamon (not buffy or grayish); skull with interorbital breadth more than 13.5 mm. ______ C. parvidens
Color in summer buffy or grayish; skull with interorbital breadth less than 13.5 mm. ______ C. leucurus

Cynomys leucurus Merriam, 1890
Cynomys leucurus Merriam, 1890:33. Type locality “Ft. Bridger, Wyoming.”

CONTEXT AND CONTENT. Context noted in generic summary above. The species C. leucurus is not divided into subspecies (Hollister, 1916).

DIAGNOSIS. The white-tailed prairie dog is the largest member of its subgenus (total length 340 to 370 mm.), and is only slightly smaller than C. ludovicianus and C. mexicanus, but has a much shorter tail (40 to 65 mm., rather than 82 to 110 mm.). The general color of upper body parts is yellowish buff, streaked with blackish. A spot above the eye and a large area on the cheek are blackish brown. The tail is white; hairs of the proximal half have bands of blackish interspersed with pale cinnamon, whereas those of the distal half are clear white.

GENERAL CHARACTERS. Measurements (in millimeters) are: total length 340 to 370; length of tail 40 to 65; length of hind foot 60 to 65; condylobasal length 56.0 to 61.3; zygomatic breadth 41.7 to 45.4; mastoid breadth 27.4 to 30.0; length of nasal 20.7 to 23.1; length of mandible 43.6 to 44.9; alveolar length of maxillary toothrow 15.1 to 16.0 (modified from Hall and Kelso, 1959, and Hollister, 1916). More detailed descriptions are presented by Hollister (1916), Hall and Kelso (1959) and Long (1965). The skull is illustrated in Figure 1.

DISTRIBUTION. This species is found in parts of Colorado, Utah, Wyoming, and Montana (Figure 2). More specifically, it occurs from the Bighorn Basin, in southern Montana, south across central and southwestern Wyoming into western Colorado and northeastern Utah; east to the Laramie Mountains in Wyoming, and into North Park, Colorado; south into the lower Gunnison Valley; west a few miles across the Bear River Divide into extreme northern Utah, and farther south, into the Green River Valley (Hollister, 1916; Hall and Kelso, 1959; Long, 1965; Durrant, 1952; Warren, 1942; Hoffmann et al., 1969; Lechleitter, 1969). The local distributional pattern, particularly in the southern part of the range, is imperfectly known, owing in part to extinction of the species in some areas.

FOSSIL RECORD. According to Black (1963:226), “we do not yet have unequivocal evidence of the existence of Cynomys prior to the Pleistocene.” However, several Pleistocene prairie dogs have been described. Hay (1921) based C. niobrarius on a palate from the “Sheridan beds” in Nebraska, probably equivalent in age to the Loveland formation, late Pleistocene. Green (1960) named and described C. spisiwa from a mandible collected in Tripp County, South Dakota, from the Sand Hills formation, and later suggested that it might prove to be synonymous with C. niobrarius (see Green, 1963); Green (1960:546) claimed that “C. spisiwa combines characteristics of both C. ludovicianus and C. leucurus but is closer to the latter species.” The late Pleistocene date does not, however, permit the speculation that spisiwa might be ancestral to both modern species, as Green originally suggested. Black (op. cit.) thought spisiwa not separable from C. leucurus. Dalquest (1967), however, thought that niobrarius and spisiwa were black-tailed prairie dogs, referable to the subgenus Cynomys.

there is much evidence of wear over the forward half of the body, and by early September the full renewal has commenced. As in the case of C. ludovicianus, this progresses forward, and by September 25 to October 1 is complete."

**FUNCTION.** Electrophoretic patterns of blood sera have not previously been reported. Albumins of C. leucurus and C. gunnisoni migrate more rapidly than do those of C. ludovicianus. Five transferrin bands were observed among C. leucurus, C. gunnisoni, and C. ludovicianus. C. gunnisoni and C. leucurus from Wyoming is characterized by the slowest pair of bands (TI 5.5), which do not occur in the other two species. Work in progress by J. J. Pizzimenti confirms that C. leucurus from other localities show similar transferrin band patterns.

**ONTOGENY AND REPRODUCTION.** Some gross morphological changes in gonads were reported by Stockard (1929, 1934) and Tileston and Lechleiter (1966), and histological changes were described by Bakko and Brown (1967). Copulation occurs in late March and early April at which time the accessory sex glands exhibit peak activity and the testes are regressing from their peak development of a week or so earlier (Bakko and Brown, 1967). Gestation requires about 30 days (Stockard, 1934; Bakko and Brown, 1967) and parturition occurs in late April or early May. The mean litter size from embryo counts (N = 25) is 5.64 ± 0.74 S.D. (range 3 to 8); corpora lutea counts (N = 48) average 5.40 ± 0.72; and placental scars (N = 20) average 4.90 ± 0.77 (Bakko and Brown, 1967). One litter is produced per reproductive season, as is known of the growth and development of young prior to their first appearance above-ground in late May or early June.

**ECOLOGY.** The ecological roles of prairie dogs in general (including C. leucurus) were reviewed by Clark (1968). Because of their presumed “direct competition” with livestock, prairie dogs have for about 100 years been subject to continuous disturbance and killing by federal, state, and private interests (Cottam and Caroline, 1965). Prairie dogs have been regarded as "pests" since the settlers began intensive use of the Great Plains, deserts, and intermountain grassland for grazing and agriculture. Wildlife management, by restoring the numbers of natural predators of prairie dogs (badgers, coyotes, bobcats, weasels, and raptors) has accompanied this intensive use. Bond (1945), Taylor and Davis (1947), Osborn and Allen (1949), and Norris (1950) indicated that prairie dogs tend to be most numerous on range depleted by livestock overgrazing. These investigators concluded that large populations of prairie dogs are more often an effect of range deterioration rather than its cause, and may be symptomatic of poor range condition (Fichter, 1953). It is commonly believed that prairie dogs cause range deterioration, but according to Bond (1945) under certain conditions prairie dogs actually accelerate recovery of deteriorated ranges. Rodents feed mainly on annual forbs and other plants typical of early stages of succession (overgrazed range) and as a result favor the increase of climax plant species, principally good forage grasses. Clements and Clements (1940) have shown that when forage is in short supply, prairie dogs are preferred by prairie dogs over grass as forage. Koford (1958) stated that if man does not alter the grassland, it is improbable that prairie dogs alone will reduce the range vegetation below the stage where short grasses are dominant. Although most of the ecological studies cited above were based on C. ludovicianus, the general conclusions seem valid for C. leucurus also.

Revegetation patterns of burrow moundings were investigated by Clark (1970) and range relationships by Clark and Kinkler (1970). Mean density of burrow openings varies from 59.1 per hectare (= 23.9 per acre, Clark, 1969) to 54.1 per hectare (= 21.9 per acre, Tileston and Lechleiter, 1966). Prairie dog density averages 3.2 per hectare, range 0.7 to 6.2 (= 1.3 per acre, range 0.3 to 2.5). Maximum densities coincide with the initial appearance of pups above-ground and are as high as 8.4 per hectare (= 3.4 per acre, Tileston and Lechleiter, 1966).

Immigration occurs chiefly in early spring (March and April). In one colony in Wyoming, 12 new animals took up residence one spring and three the next. Clark (1969) and Tileston and Lechleiter (1966) found that immigration played a relatively important role in a town in northern Colorado. From the Wyoming colony, two males emigrated to other colonies and took up residence. Movements up to 2.7 km (1.7 miles) have been reported.

No figures on longevity or population turnover are available.

**Figure 2.** Distribution of Cynomys leucurus modified after Hall and Kelson (1959:368). The scale at lower left is 100 miles long.
in the literature. However, Clark (1969) noted an 8.9% loss of members of one colony between June and October of 1966. The mortality rate from September 24, 1966 to spring 1967, was 50% (36 animals) of the population. The major predators, golden eagle and badger, seemed to be only a minor cause of mortality. Tileston and Lechleitner (1969a) found only 25.9% of a population in Colorado was retaken the following year. Of the 24% animals lost, the fate of 75% was not determined. Plague seems to be a major mortality factor among prairie dogs (Clark, 1969; Lechleitner et al., 1969) as June and September 6 were two 86% losses sustained by a colony in Wyoming, presumably from plague.

Home ranges of juveniles are generally larger than those of adults. The mean of maximum measured lengths of home ranges for adults is 106 m. (347 feet) or about 90% of that of the mean of 116 m. (380 ft.) for juveniles. Mean home range size for adults is 5.9 hectares (24.3 acres) or 86% of that of the mean for juveniles of 6.9 h. (28 acres) (Clark, 1969). Home ranges are more or less similar in size from year to year, but the position of the home range of an individual is not always the same. Sometimes home ranges of individuals overlap, and sometimes the home range size of a juvenile is reduced the following year when it is an adult. A few juveniles move to the periphery of the colony to establish their adult home ranges.

BEHAVIOR. Some aspects of behavior were studied by Tileston and Lechleitner (1966). Waring (1970) recorded sounds produced by white-tailed prairie dogs. He noted that these sounds are similar to those produced by C. gunnisoni, although they are distinctly shorter and often more communicative than C. ludovicianus. Also, Miller (1966b) reported differences. Erpino (1968) described copulatory behavior of C. leucurus. White-tailed prairie dogs do not have a system of social organization similar to that seen in the black-tailed prairie dog (King; 1955; Smith; 1958). The only functional social unit is a transitory one involving the lactating female and her dependent young. Tactile social interactions include sexual and agonistic behavior, "play" (between young and rarely between young and adults), and "kissing" (nasal-nasal contact). Mutual grooming and group cooperation in burrow construction has not been reported in C. leucurus. Vocal stimuli (sounds) and visual stimuli, to some degree, do coordinate and unify the behavior of the colony.

Clark and Brown (1968) and Tileston and Lechleitner (1966) have described daily and seasonal activity patterns. The general pattern for a colony in Wyoming at an elevation of 2195 m. (7200 ft.) was as follows. Prairie dogs were never observed before sunrise or after sunset. The exact time of emergence each morning varied with the season, being earliest in June and latest in November. Daily activity is characterized by unimodal curves peaking usually in the early afternoon. Generally, not all adults are active above ground at the same time, even in favorable weather. Within a colony, some activity throughout the day except when weather conditions (such as heavy rain, hail, or high temperature) discourage above-ground activities. Daily activity is not restricted by wind until velocities near 65 to 80 kph (40 to 50 mph) are encountered, above which there is an obvious decline in activity. At wind velocities of 90 to 95 kph (55 to 60 mph) prairie dogs remain near their burrows and activity consists mainly of sitting in or near the burrow.

Temperature is an important regulator of activity. Activity peaks place within the ambient temperature range of -10°C to +20°C (15°C to 70°F). At temperatures of 24°C to 27°C (75°F to 80°F), animals are active for short periods of time (10 to 15 minutes), but activity is restricted to brief appearances above ground at the burrow entrance. Animals left in open wire traps at 24°C begin to show increased activity about 30 minutes, and die when exposed to direct sunlight and 27°C (80°F) temperatures for 2 to 3 hours. During heavy snow storms of several hours duration, prairie dogs go below ground, and afterwads above-ground movements in fresh snow are limited. Light rain showers lasting only a few minutes do not suppress above-ground activity, but during prolonged heavy rain and during hail storms all above-ground activity ceases.

Initial emergence of white-tailed prairie dogs in the spring varies from year to year, but appears to be independent of above-ground weather conditions. Prairie dogs in the Laramie, Wyoming, area were first out in early March of 1964 and in late February in 1965, 1966 (Bakko and Brown, 1967), 1967, and 1968 (Clark and Brown, 1968). In 1967 and 1968, prairie dogs continued to emerge from hibernation until mid-March. Adult males became active about 2 to 3 weeks before adult females. Juveniles emerged in late May and the first week in June and thereafter activity in the colony as a whole greatly increased.

The number of prairie dogs observed above ground begins to decline in April and early June of 1967. Many adults that disappeared during the summer months reappear after the following spring in the same areas in which they were last seen. Possibly many animals hibernate for the entire period of subterranean life; although some adult prairie dogs that become dormant early in the season may reappear for a few days in August. Adult males disappear below ground several weeks before adult females. In the latter part of the season all the juveniles begin hibernating in late August, but others do not enter hibernation until late October or early November. There is no apparent difference in time of seasonal disappearance between juvenile males and females.

Animals were active in a Wyoming colony (elevation 2195 m. or 7200 ft.) for a total of about 8% months (Clark and Brown, 1968) to about 5 months (from late February to mid-August) and juveniles for about the same length of time (from June to late October or early November). Tileston and Lechleitner (1966) reported that white-tailed prairie dogs in northern Colorado (elevation 2500 m. or 8200 ft.) were active a total of only 7 months.

GENETICS. The diploid chromosome number in C. leucurus is 50; the karyotype contains seven pairs of metacentric chromosomes and 18 pairs of subtelocentric or subteloeric chromosomes. Five females from Wyoming collected by Clark were analyzed by Nadler; sex chromosomes were not therefore identified and are included in the above enumeration. Although both C. leucurus and C. ludovicianus have a 2N of 50, they differ considerably in their complements of metacentric and subtelocentric chromosomes, the latter having 12 pairs of metacentric and nine pairs of subteloeric autosomes (Nadler and Harris, 1967). Work in progress by J. J. Pizzinetti confirms the 2N = 50 from elsewhere within the range of C. leucurus.

LITERATURE CITED


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