

CHANGES IN VEGETATION ASSOCIATED WITH
THE REMOVAL OF PRAIRIE DOGS

Barry Bennett
and
Jane Bock
Department of EPO Biology
University of Colorado
Boulder

Objectives

From 1938 to 1982 the total acreage of Black-tailed prairie dog (*Cynomys ludovicianus*) towns in Wind Cave National Park increased from 290 to 750 ha. In 1982 a management plan was introduced that reduced the area covered by prairie dog towns to 290 acres. The objective of this study is to monitor vegetation changes that occur following the removal of prairie dogs. These data will prove useful in developing management plans for the removed prairie dog towns and also provide useful data on the vegetation and seed bank composition on the Wind Cave National Park grasslands.

Methods

Twenty-four transects were established on sites throughout Wind Cave National Park; eight transects were placed on active prairie dog towns, eight were on towns where the prairie dogs had been removed, and eight were located on open prairie sites with similar topography to prairie dog towns but with no record of prairie dog use. Each transect was sampled for above-ground vegetation three times during the summer of 1989 (May, July and August). Vegetation on each transect was measured with 10, 1-m² quadrats, recording data on percent cover, number of individuals and average height of each species present in each quadrat.

In August, 240 soil samples were collected for analysis of the viable seed bank. 100 ml soil samples were collected from each vegetation quadrat and taken to Boulder. Samples were spread above sand and placed under a misting system in a greenhouse. Seedlings are identified to species; unidentifiable seedlings are transplanted and grown until identification is possible. When no more seeds can be induced to germinate, these soil samples will be submerged in water to

determine the number of seeds still dormant.

Results

Preliminary results suggest that former prairie dog towns are intermediate to the active prairie dog towns and open prairie in many community measurements. However, the response of each species on these towns does not appear predictable. Height on the towns from which prairie dogs were removed was intermediate to the active towns and undisturbed prairie for all months (Table 1).

Table 1. Height of live plants in cm (weighted by cover).

Month	Active Towns	Removed Towns	Open Prairie
May	5.6	7.9	10.1
July	4.9	6.8	9.6
August	5.8	8.4	9.8

When vegetation data was analyzed by species, we found species specific responses to the removal of prairie dogs. Of the plants that were much more common on prairie dog towns than open prairie, some were greatly reduced following prairie dog removal (Draba reptans, Myosurus minimus, Rosa arkansana), while others persisted (Lappula redowskii, Sphaeralcea coccinea). Of the plants found in much greater densities on open prairie than on active dog towns (Carex filifolia, Stipa comata), none were found in higher densities on the towns.

Several plant species had much larger concentrations on the removed towns than on either the active towns or the open prairie (Bromus tectorum, Salsola iberica). Most of these species are exotic plants and the percent cover of exotics is much greater on the removed prairie dog towns than on active prairie dog towns or open prairie (Table 2). This is interesting because exotics have not been successful in invading the heavily disturbed active prairie dog towns, and native species have been slow to invade the removed prairie dog towns even though prairie dogs are known to abandon towns in natural systems.

Table 2. Percent cover of native and exotic flora. Cover for each species is taken from the month with the largest cover for that species.

Origin	Active Towns	Removed Towns	Open Prairie
Native	49.4	32.2	33.0
Exotic	2.6	22.2	4.5
Unknown	20.3	17.4	29.4

The study of the seed bank has not been completed. This work should provide additional information on the revegetation processes prairie dog towns. The vegetation data will be further analyzed using information gained from Rich Klukas (pers. comm.) on the history of each of the transects. Some of the transects had been previously used for agriculture and the length of time that each prairie dog town has been active is highly variable. It is hoped that this information can be used to explain some of the variation in the vegetation among the transects within each of the three treatments.

Conclusions

Preliminary results suggest that the removal of prairie dogs is followed by an invasion of exotic plants and a reduction in the diversity of native plants. Active management may be necessary for the removal of exotic species and to enhance recovery of native species.