

PRAIRIE DOG DISPERSAL AND HABITAT PREFERENCE
IN BADLANDS NATIONAL PARK

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Objectives

The ongoing prairie dog research in Badlands National Park, presently in its second year of investigation has four main objectives. They are to investigate:

1. Immigration and egression patterns of blacktailed prairie dogs;
2. Their vegetational habitat preferences;
3. Their habitat preferences in terms of soils and aspect; and
4. Prairie dog seasonal food habits.

In short, we hope to better define quality in prairie dog habitat in terms of important ecological variables, both in the animal's social and physical environment. In the following paper we will outline a segment of the research which deals with an important applied ecological aspect of the research, i.e. the reinvasion of prairie dogs after extermination. The results of the experiment shed some light upon a problem which has plagued managers concerned with prairie dog control.

Methods

The experiment was carried out along the northern boundary of Badlands National Park during 1981 and 1982 upon land owned by Crown Ranches of Wall, South Dakota. In the 1981 field season, a 6 ha. area on the private side of the Park boundary was staked in a 25 meter by 25 meter grid pattern and mapped. Additional grids were also staked to enclose a section of the dogtown adjacent to the study site and inside the Park boundary.

Prairie dogs within these areas were trapped, weighed, sexed, marked by toe-clipping, and released. The area on the private side of the boundary was poisoned using zinc phosphide. Poisoning was carried out 2 weeks after the trapping session, and therefore the animals were well adjusted to the bait.

During 1982, prairie dogs were live-trapped in the third week of August.

Tomahawk 36-inch live-traps were used, baited with a molasses coated mixture of rolled oats, rolled barley and cracked corn (green chop). Once again, the individuals were located per grid section, marked, sexed and weighed. Multiple captures per trap were common. From prior experience, trapping success for an 8-day trapping session of blacktailed prairie dogs accounts for a minimum of 90% of the individuals, where there is more than 1 livetraps available for every 2 animals present. The error limits of this method are, therefore, set at $+0.11N$ and $-0.10N$, where N is the number of individuals captured in group μ .

Results

A total of 76 individuals were captured on the study site in 1981. A complete breakdown of these individuals by sex and age is listed in Table 1. During the 1982 season, however, 26 individuals were captured in the same location within two trapping sessions. Totals of prairie dogs captured during both sessions remained constant within the estimable limits of the trapping method. The June trapping session yielded 19 individuals, while in August 17 prairie dogs were successfully trapped. Again, a complete breakdown of June-session captures and August-session captures is available in Table 1. It is important that none of the reinvasion females, neither yearlings nor adults, had lactated that year.

Three of the 26 individuals captured in the study area were particularly noteworthy. Firstly, a single male yearling was captured during the June session which, as a juvenile, had escaped 1981 control methods upon the private land, i.e. indicating 98.7% control of prairie dogs during the 1981 application. During that month, he was observed in the company of two yearling females, only to remain unobserved during the August trapping session. One of these females was, however, later captured in the territory of another male nearly 75 meters distant.

Two yearling females, captured as juveniles together in the same coterie (family group) during August of 1981 on the National Park side of the boundary, were recaptured on the private side of the boundary in June, 1982. Both travelled nearly 500 meters to their newly acquired territories, each finding the company of different males. Interestingly enough, by August trapping session, one of these females had returned across the Park boundary to her natal coterie. A similar instance of a returning long distance disperser was recorded by Garrett (personal communication) in his study of long distance dispersal by blacktailed prairie dogs in Wind Cave National Park.

The total number of prairie dogs residing in the previously poisoned area remained constant (within the expected limits of error of the trapping method). For June, the female to male ratio was 10/9 (1.11), and in August 7/10 (0.70).

Conclusions

The study's primary conclusion is that peripheral families of a prairie dog town are not overwhelmingly involved in supplying individuals toward the recolonization of adjacent poisoned sites. Only two of the twenty-five

Table 1. Summary of original population (1981) and reinvasion population (1982) demographics as estimated by live-trapping (estimate of limit of error for method = $+0.11N_{\mu}$, where N_{μ} is the number of individuals of group μ captured).

ORIGINAL POPULATION (1981):

Trapped: July 1981

<u>Age class</u>	<u>Males</u>	<u>Females</u>	<u>Total</u>
Adults:	9	11	20
Yearlings:	3 ^a	3	6
Juviniles:	31	19	50
Σ	<u>43</u>	<u>23</u>	<u>76</u>

REINVASION POPULATION (1982)

Trapped: June 1982

<u>Age class</u>	<u>Males</u>	<u>Females</u>	<u>Total</u>
Adults:	4	1	5
Yearlings:	5	9	14
Juveniles:	0	0	0
Σ	<u>9</u>	<u>10</u>	<u>29</u>

Trapped: August 1982

<u>Age class</u>	<u>Males</u>	<u>Females</u>	<u>Total</u>
Adults:	4	1	5
Yearlings:	6	6	12
Juviniles:	0	0	0
Σ	<u>10</u>	<u>7</u>	<u>17</u>

^a nonsedentary individuals

immigrants were known to have come from family groups in the vicinity of the nearby town periphery, and even these two females travelled nearly 0.5 km to their new homes. Even allowing for inaccuracies due to the trapping method's incomplete census, it seems certain that a large proportion of the remaining twenty-three individuals emigrated from families beyond the unpoisoned dogtown periphery, i.e. beyond 0.5 km.

It is also evident that dispersing female prairie dogs are generally non-lactating, and therefore non-breeding individuals of the present year. This observation strengthens the presumption that dispersal is a means of seeking improved reproductive fitness (Tamarin 1980), and is therefore a behavior having obvious selective advantages. The value of those advantages and the inherent risk of undertaking dispersal are parameters whose values change per sex, age-class, and environment of each prairie dog. Dispersers, however, do not breed upon reaching their new area, investing their energy instead to building fat reserves, burrowing, and creating bonds with newly acquired mates. Even without reproducing, there appears to be a great deal of stress upon these immigrants.

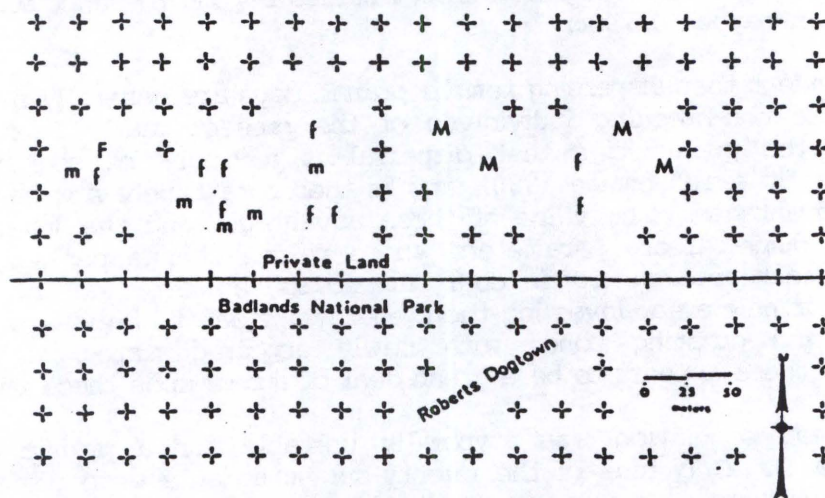
The reinvasion population was atypically unstable for a prairie dog colony (Hoogland 1981). Only nine of the twenty-six immigrants were common to both June and August trapping sessions. In addition, two of the female yearlings were located with different mates (Figure 1) after the disappearance of their original companions of June. Predation, social conflict, or a combination of both processes may be cause for this instability, though no direct evidence is available. Predation in prairie dog populations of low density is likely, however, since surrounding vegetation remains tall and visibly dense, and protection afforded by only a few family members can only be minimal.

In summary, the study to this point has yielded data suggesting that a highly mobile sub-population of seasonal dispersers exists among blacktailed prairie dog colonies. Differential participation of age-classes in immigrant populations (Table 1) may further suggest that dispersal is a composite of a number of different reproductive strategies.

Literature Cited

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- Tamarin, R. H. 1980. Dispersal and population regulation in rodents. M. N. Cohen, R. S. Malpass, and H. G. Klein, eds. in *Biosocial mechanisms of population regulation*. Yale Univ. Press, New Haven, CT, USA.

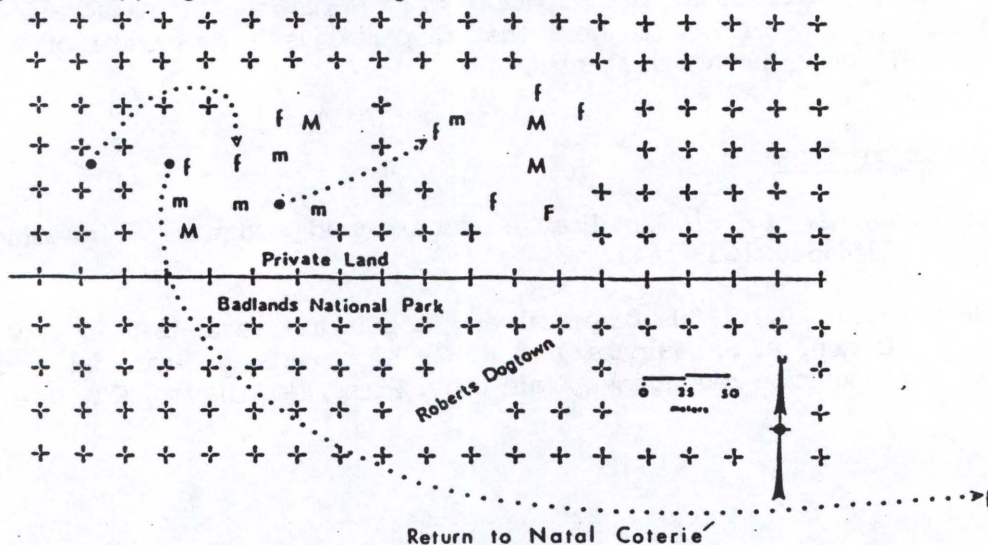
June trapping session (June 12-20, 1982)



f :yearling female m :yearling male
 F :adult female M :adult male

• : former location of female (during June) before recapture (during August) in the territory of a new mate.

August trapping session (August 1-8, 1982)



Return to Natal Coterie

Figure 1. Distribution of immigrant blacktailed prairie dogs based upon centroids of capture locations during June and August trapping sessions. Note the movement of certain females into different groups between sessions. Overall population instability was characterized by the fact that only 9 of 26 animals were common to both trapping sessions.