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Research Brief for Resource Managers

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Small Mammal Impacts on *Ceanothus* Seedlings

Mills, J.N. 1983. Herbivory and seedling establishment in post-fire southern California chaparral. Oecologia 60:267-270.

Following a small prescribed burn in chaparral, San Diego State University researcher James Mills conducted a simple caging experiment to investigate impacts of herbivory on seedling establishment of two chaparral species.

To do these experiments, 2.5 acres of chaparral were burned in December of 1981. In May 1982, Dr. Mills established multiple replicates of seven treatments of different combinations of cage exclosures and controls placed over the newly germinated seedlings. The seedlings in all the 40x40cm plots were counted and examined for signs of herbivory every month for a year. In addition to these replicates, 60 seedlings of each species were tagged and observed twice for the results in Table 2.

He found that small mammals had a significant effect on seedling survivorship but that insects did not. Especially interesting was that mammalian herbivory had differential effects on the two shrub species. When the seedlings were protected from the mammals with a cage, desert ceanothus (*Ceanothus greggii*) survived significantly better than chamise (*Adenostoma fasciculatum*); 53% vs 34 %, but when the seedlings were uncaged, chamise survived in greater numbers than ceanothus; 15% vs 9%. Herbivory was greatest in the fall season (Table 2).

Management Implications

- Insect herbivory had no measurable effect on seedling establishment.
- Post-fire herbivory by small mammals (brush rabbits) decreased seedling establishment of desert *Ceanothus*
- Herbivory effects in *Ceanothus* were much greater than in chamise, tipping seedling survivorship in favor of chamise, despite the greater physiological tolerance and survivorship of ceanothus in the absence of herbivory.
- The experimental fires were relatively small and surrounded by unburned chaparral. It is unknown what effect the small size of the burned patch may have had relative to larger fire events.

Table 2a, b. Survival of tagged seedlings in percent. **a** In late spring and summer (16 April–20 August), based on 60 seedlings of each species. **b** In fall (21 August–28 November), based on 56 chamise and 60 ceanothus seedlings

Period	Species	Killed by herbivores	Other deaths	Total mortality	Survival
a) Spring/Summer	Chamise	10	62	72	28
	Ceanothus	20	43	63	37
b) Fall	Chamise	25	02	27	73
	Ceanothus	43	00	43	57