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Growth Sequence of Post-fire Chaparral Resprouts in California's Santa Monica Mountains

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Pepperdine University, Malibu, CA 90263

Abstract

The post-fire resprout succession of California Chaparral was surveyed in Corral Canyon of the Santa Monica Mountains. The primary objective of this investigation was to determine the sequence of Chaparral post-fire resprouts and possible correlations to the life histories of those species. Over a three month period, four designated study sites were visited every two weeks, surveying the number of adults, the number of resprouts and the height of the resprouts. It was found that both the facultative and the obligate typed species were successful in post-fire resprout. Facultative species were the first to resprout and obligate species displayed the most rapid growth rate upon resprouting. It is concluded that the life histories of these Chaparral species is directly related to their time of regrowth as well as their rate of regrowth. Also, that facultative sprouters, specifically *Adenostoma fasciculatum* and *Ceanothus spinosus*, are the first to resprout followed by the remaining facultative species, the obligate species, and lastly the non-sprouting species.

Introduction

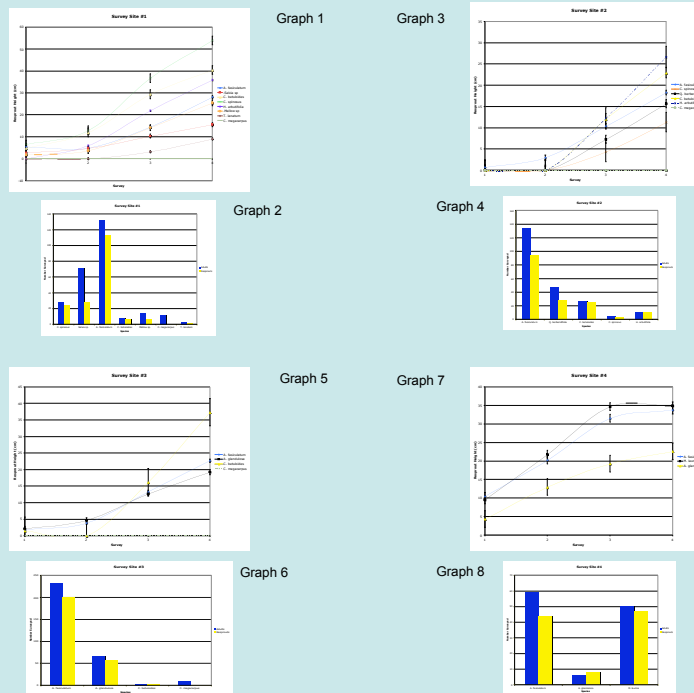
The Santa Monica Mountains are a part of five areas of the world which are classified as Mediterranean climates (Cowling et al., 1996). This particular climate is characterized by its long, dry summers; short, wet winters and frequent wildfire. The vegetation in Mediterranean climates has adapted to survive this sometimes brutal combination of conditions. Some species of chaparral have evolved to resprout after fire (Barro and Conrad, 1991). The mechanisms behind the re-growth after fire have been and continue to be studied in a number of laboratories, but the sequence of resprouts is yet to be fully understood. To make the project even more intriguing, chaparral can be categorized into three basic life histories, differing dramatically from one another. The non-sprouters (NS) such as *Ceanothus megacarpus*, do not resprout after fire and rely solely on seed banks to germinate. Facultative sprouters (FS) like *Adenostoma fasciculatum* are an intermediate life history, both resprouting and germinating. The other extreme are the obligate sprouters (OS) like *Quercus berberidifolia*, which only resprouts after fire (Davis, 2001). The sequencing of the three life histories is an exciting field of study that has not been looked into with any great deal. The fire in Corral Canyon in 2007 provided a wonderful opportunity for the sequencing of resprouts to be studied. It is hypothesized that facultative sprouters, having two possible mechanisms for growth, would be most capable of first appearing after a fire.



Materials and Methods

In designating the four study sites, a compass and tape measurer were used to determine specific plots. The coordinates and dimensions of the plots were recorded. Initial surveys were conducted to determine the plots' existing species. Identifications of the burnt adults were determined through key characteristics of the bark and root crown, if present (Fig. 1, 2, 3 & 4). Following initial surveys, additional assessments were conducted every two weeks, over a three month period, recording the number of burnt adults and heights of resprouts (Fig. 5).

Results



Graphs 1 & 2. Line graph of Survey Site #1 showing resprout growth at each of the four assessments in relation to other existing species. Facultative sprouters shown to sprout first by *A. fasciculatum*. Obligate sprouters shown to sprout most rapidly, seen with *C. spinosus*. These trends are demonstrated in all of the eight charts with their respective species and life histories. Bar graphs shown with their corresponding Survey Site, indicating final number of resprouts and average number of adults for each species. **Graphs 3 & 4.** Line and bar graph of Survey Site #2. **Graphs 5 & 6.** Line and bar graph of Survey Site #3. **Graphs 7 & 8.** Line and bar graph of Survey Site #4.

Study Sites



Fig. 6 & 7. Study sites at Corral Canyon in the Santa Monica Mountains of California. Location of wild fire in the year, 2007.

Conclusions

- *Adenostoma fasciculatum*, a facultative sprouter, successfully resprouted in each of the four study sites
- Facultative sprouters, *Adenostoma fasciculatum* and *Ceanothus spinosus*, were the first to resprout following fire
- Facultative sprouters maintained similar growth rates in each of the four study sites
- Obligate sprouters, *Cercocarpus betuloides*, *Heteromeles arbutifolia* and *Quercus berberidifolia*, found in sites #1, #2 and #3, successfully resprouted with a more rapid growth rate in comparison to facultative sprouters
- Non-sprouters, *Ceanothus megacarpus* and *Trichostema lanatum*, showed little to no regrowth of seedlings following fire
- Facultative sprouters were found to be the first of the three studied fire responses to resprout, but upon regrowth, Obligate sprouters were recorded to have the quickest growth rates

Literature Cited

- Barro, S. C. and S. G. Conrad (1991) Fire effects on California chaparral system: an overview. *Environment International* 17:135-149
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Acknowledgements

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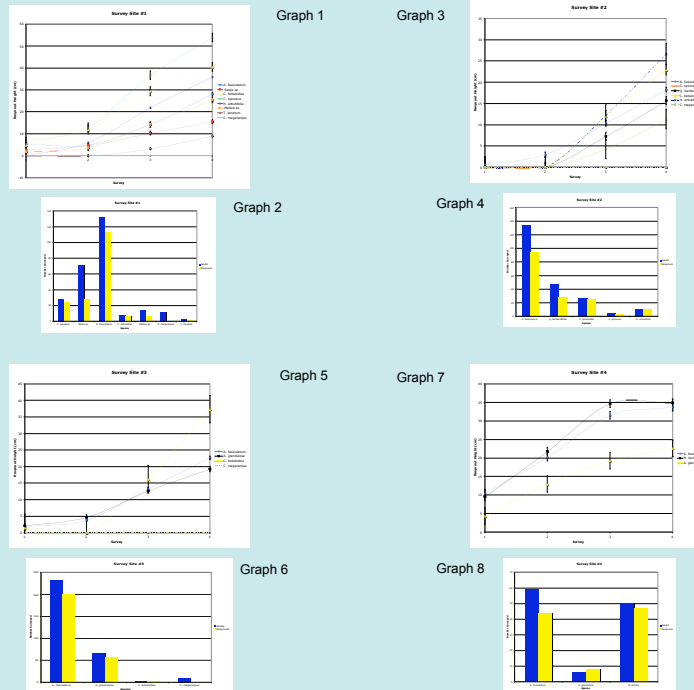
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