

Fungal Responses to the Cerro Grande Fire

April 26, 2001

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Abstract

This is a new proposal to monitor the responses of fungi to the Cerro Grande Fire. A site has been selected on Bandelier National Monument property that is near State Highway 4 and that was burned at varying levels of severity. We propose to survey this site every two weeks during the growing season for five years. During these surveys, the presence and population levels of fungal fruiting bodies will be recorded in written and photographic form. Voucher specimens will also be collected where necessary for identification purposes. The results will be analyzed and compared with survey results from similar burned and unburned areas in the Los Alamos region.

Introduction

The New Mexico Mycological Society has initiated a project to sample areas that were severely burned in the Cerro Grande Fire but were not subjected to rehabilitation treatments. We propose to monitor for the presence and population levels of fungal species through time as the burned ecosystems undergo natural recovery. The project will be implemented by Society volunteers and by volunteers from other interested groups. Work will be conducted annually during the growing season and it will comply with all applicable regulations of the land management agencies involved. Voucher specimens will be deposited in an approved museum, and all records of the sampling and subsequent reports will be made generally available to the public and to land management agencies. During the conduct of this project, there will be no disturbance to Bandelier environments, other than minor soil disturbances during collections of voucher specimens. There will be no safety hazards other than those associated with field activities conducted within 300 m of a paved highway.

Hypothesis

We hypothesize that the fungal response, in terms of presence and populations of fruiting bodies, to fire will be different between the lightly burned area, the moderately burned area and the severely burned area. The null hypothesis states that there will be no difference in the fungal presence and population responses between these three areas that were subjected to different burn severity types.

Methods

Only one area that had been burned during the Cerro Grande Fire was classified as high burn severity and did not receive any rehabilitation or restoration treatments. This consists of two tracts of land on Bandelier National Monument south of Highway 4, near Apache Springs Trail and American Springs Road. The forest overstory is dominated by ponderosa pine, Douglas fir and white fir. The habitat type appears to be white fir/Gambel Oak. We selected one plot of land in this area where burn severities range from lightly burned to moderately burned to severely burned. The approximate area to be sampled is shown in the center of Figure 1. The locations of previously established sample plots for forest vegetation and wildfire hazards (1997 through 2000) and for fungi are also shown in this figure.

Fungi will be sampled in each of these areas and within each of the selected burn severities. The survey will continue for five years, or until 2005. Sampling will begin as soon as practical after the snow melts and will continue at two-week intervals until approximately October 1. During each visit to the sample areas, the ground and wood will be searched for fungal fruiting bodies. Fungi encountered during the search will be identified to species or species group. Photographic records will be obtained where possible. Voucher specimens will be obtained if this is warranted by the presence of a sufficient number of fruiting bodies. All other fungal material will be left on site. Data will also be obtained for the date of the sample, the fruiting habit, the characteristics of the immediate environment, recent weather conditions, and other information pertaining to the growth, health and identification of the fungus. The abundance of fruiting bodies for each species will also be recorded and mapped, as appropriate.

Data will also be gathered pertaining to the growth, development, and post-fire recovery of higher vegetation at each of the sampling sites and their respective burn severities. This study will be coordinated with other related vegetation and mycological sampling efforts that are ongoing as part of the documentation of the effects of the Cerro Grande Fire and the recovery of ecosystems from the fire.

In the office, the identifications of the fungal species will be confirmed and the voucher specimens will be preserved for permanent herbarium storage. The presence/absence and abundance data will be summarized and analyzed for trends through time. Correlations of these trends with corresponding changes in the recovering ecosystems will also be established where possible. The results will be distributed to all cooperators and published in the open literature.