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Report on voluntary work undertaken in Mexico in summer 1998

Introduction

The purpose of my visit was to assist in reseach into the potential regeneration of degraded forests in Chiapas, Mexico. This is a component of a project on Sustainable Use, Conservation and Restoration of Native Forests in South-Central Chile and Southern Mexico. The initial plans of carrying out a ground vegetation survey in a pine and oak woodland in Chiapas failed due to the extensive forest fires in spring 1998. However, this offered an excellent chance for looking into the effects of the natural disturbance in the same area.

The main objectives were to investigate the rate of survival of oaks after fire, whether it was correlated with the age of the oak stems and whether the recovery of the understorey oaks was faster further away than in proximity of the nearest pine. However, as the data set would be included in a wider assessment of forest structure and development, the diversity and distribution of as well as fire damage to all other woody vegetation in the sample plots was to be assessed.

Methods

The study was carried out in the forests of a native local community, Sonora, near Comitan.The forest was dominated by two species of pine (*Pinus oocarpa* and *P. devoniana*) and three species of oak (*Quercus segoviensis, Q. crispipilis and Q. rugosa*). The ground vegetation was severely burned but had started to come back in the beginning of the study. Due to the extremely fast respouring of the oak stems, the field work had to be carried out very effeciently in a relatively short period of time. A week was spent to familiarise with the site, design the study, produce field recording sheets, gather the equipment needed, employ locals and read sufficient background information. Couple of weeks were initially planned for field work but the engagement of some of the team members in local politics and the unexpected community parties prolonged the time available.

The investigated area of the forest was approximately 0.2 km^2, close to the community centre. Therefore, this area has also been frequently disturbed by the village people when collecting fire wood, ornamentals for religious seremonies and other vegetation. Grazing by domestic stock was also present. A path from the community centre led through the forest, which concentrates the effects of more intense fire wood collection along the path rather than closer to the village.

The area was sampled by randomly selecting coordinates for the distance along the path, the direction and distance from the path, to ensure that every point in the area had the same chance for falling into the sample.This point was then used as a centre of a 100m^2 circle, accounting for the slope of the ground. In each 29 circles sampled, all trees and shrubs were identified and the following features recorded; diameter at breast height (and basal diameter for smaller trees), height, height of the fire scorch, existence of crown resprouting, estimated percentage of dead leaves, number and maximum height of basal resprouts (if any) and distance to the nearest

mature pine.

Results

The increase of pine crown survival with DBH, height and the distance from the nearest mature pine are shown in graphs 1, 2 and 3. The relationship between pine crown survival and DBH was statistically highly significant at 1% level (Logistic regression, Chi-square = 7.605458, d.f. = 1, p = 0.0058225). All sizes of the pines had surviving crowns but the largest pine with totally burned foliage was 17 cm DBH and 10 m high.

Crown survival of pines increased only slightly with height, although the relationship was statistically significant (Chi-square = 6.528317, df = 1, p = 0.0106216). All crowns of pines larger than 10 m in height seemed to have survived the fire.

Graph 2 shows the crown survival of pines in relation to proximity of the nearest mature pine tree, over 30 cm in DBH. The survival of the pines under 30 cm of DBH significantly increased with distance from a mature pine (Logistic regression, Chi-square = 9.345809, d.f. = 1, p = 0.0022368). Almost all pines at less than 5m distance from the mature pine had totally burned crown foliage and no sign of recovery at the time of observation. Only one had a survived crown at a distance less than 1 m to the mature pine.

The crown survival of oaks in relation to DBH, height and distance from the nearest mature pine is shown in graphs 4, 5 and 6. Graph 4 shows a strong, highly significant increase in oak crown survival with increasing DBH (Chi-square = 76.79247, df = 1, p = 0.0000). All oaks larger than 12 cm in DBH had survived the fire.

The relationship between oak crown survival and height is shown in graph 6. The crown survival increased significantly with height (Chi-square = 68.00528, d.f.= 1, p = 0.0000). Most of the crowns of oaks under 3m high had no surviving foliage left and the crowns of all oaks above 8 m had survived or resprouted after fire.

Graph 5 shows a slight decrease of oak crown survival with increasing distance to the nearest pine. Both species of oak, *Quercus segoviensis* and *Quercus crispipilis* show the same trend. However, the decrease of survival was not statistically significant (Chi-square = 1.751523, d.f. = 1, p = 0.1856948).

no graphs!