Int. J. Wildland Fire 6(1): 13-19, 1996

Seedling Regeneration of Two *Cistus* Species After Experimental Disturbances*

E. Luis-Calabuig[1], R. Tárrega[1] and I. Alonso[2]

[1]Departamento de Ecología, Facultad de Biología, Universidad de León. 24071 León, España
Tel. 34 87-291566; Fax 34 87-291501

[2]Estación Agrícola Experimental C.S.I.C. Apdo. 788, 24080 León, España

Abstract. The regeneration process of two *Cistus* species (*Cistus ladanifer* and *Cistus laurifolius*) was compared during the first four years after cutting, burning and ploughing in experimental plots, in León province (NW Spain). In the burnt plots, a quicker germination, followed by a higher death rate, was observed, especially for *Cistus laurifolius*. The number of seedlings tended to stabilize after one year in all experimental plots. During the whole study period, the burnt plots showed a higher number of seedlings. The ploughed plot presented the lowest number, while the cut plots kept intermediate values. The differences in cover values were not so marked in the different plots and, in the fourth year, there is still a tendency to increase. Neither the cover nor the height of the seedlings have attained the values they had before disturbance. By comparing the two species for the same disturbance, we found that the cover and height values were similar, but the number of *Cistus ladanifer* seedlings was higher. This fact can probably not be considered as a direct consequence of disturbance, as this difference was also observed previously.

Keywords: *Cistus*; Ecology; Regeneration; Seedbank.

Introduction

Shrub ecosystems are frequent in the Mediterranean basin, and are becoming more and more extended as a consequence of the progressive degradation of the forests and the abandoning of pastures and crop production. *Cistus* shrublands are a typical example of communities which have increased in distribution as a result of disturbance, particularly fire, provoked by human actions. *Cistus* spp. were classically described as "social pyrophytes" (Kuhnoltz-Lordat, 1938) or "active pyrophytes" (LeHouerou 1973; Naveh 1974)— pioneer plants spreading by seed and forming dense stands after fire. Numerous studies show that *Cistus* seed germination is stimulated by heat (Lopes 1988; Thanos and Georghiou 1988; Trabaud and Oustric 1989; Corral et al. 1990; Valbuena et al. 1992), with a strong recovery response after prescribed burning (Legrand 1993; Santiesteban et al. 1993). According to Keeley (1986), the rapid growth rate and early flowering of these species makes them resilient to relatively frequent fires. However, Trabaud (1987), on questioning the terminology of "pyrophytes," points out that *Cistus* spp. are not fire-favored species but rather opportunists occupying bare areas free of aggressive competitors.

The aim of this study is to comparatively analyse in two *Cistus* species, *Cistus ladanifer* and *Cistus laurifolius*, the recovery response to three of the degrading impacts to which they are more usually subjected: burning, cutting and uprooting. To do this, experimental plots were established in which these three types of disturbance were carried out, although in the *Cistus laurifolius* plots uprooting was not possible. Therefore, the aim is to compare on the one hand the recovery capacity of each species with relation to the disturbance and, on the other hand, their response to common disturbances (burning and cutting). In previous works (Alonso et al. 1992) better recovery was observed in the first year after burning rather than after cutting, shown both in a greater number of seedling as well as in greater cover percentages. The specific aim in this case is to determine whether the greater density in the burnt plots is maintained in the following years and in which way it affects seedlings' growth and the population dynamics. It is also aimed to establish whether mortality, if it exists, is provoked to a greater extent by low winter temperatures or by the dry summer season.

*Originally presented at the 2nd International Conference on Forest Fire Research. November 21-24 1994, Coimbra, Portugal.