

Plant Population Interactions and Management: A Summary¹

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Vegetation changes, which have taken place in Mediterranean regions because of man's influence, have occurred because of interactions between changed fire frequencies and introduced plant and animal species on one hand and plant demographic and species growth properties on the other. The clarification of these interactions will place the prediction of the long-term impacts of man's activities on the vegetation of Mediterranean regions on a more scientific basis. Species composition depends on seed germination, the increasing number of shoots on the individual plant, development of reproductive shoots, and patterns of growth and death of the individual shoots. These processes take place within the seasonal rhythm of the Mediterranean-type climate with its cool, wet winters and hot, dry summers and with low nitrogen and phosphorus availabilities.

The paper by Marilyn Fox reviewed the changes in the vegetation of the Mediterranean regions of Australia from before European settlement through the degradation of the natural vegetation under agricultural practices, with introduced species, and altered fire regimes. The paper presented a case study of vegetation change in a Mediterranean-type region.

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Fred Kruger's paper, which is based on experiments in the Cape Fynbos of South Africa, developed the patterns of the influences of fire frequency on vegetation composition. Frequent fires can eliminate certain seeding shrubs which have long growth periods before they reach the age of reproduction. Infrequent fires can also eliminate certain shrubs where senescence in some species results in less production or lower quality of seeds that need a fire before release or germination. Kruger pointed out the need for research on the demography of seed production and on the dynamics of soil and canopy seed pools.

The paper by Paul Zedler developed the importance of the demographic patterns of seed production. This paper also emphasized the role of seed dispersal and the size of individual disturbances in affecting the long-term species composition following several disturbances. Jon and Sterling Keeley's paper dealt with the controls of the germination of herbs, which characteristically are abundant in Californian chaparral for only a short period after a fire. The growth of the plant involves the plant as a physiological unit and the seasonal dynamics of growth, reproduction, and death. Gloria Montenegro and co-workers reviewed the phenology, growth dynamics, net productivity, and mortality of shrubs and herbs of the Chilean matorral. Finally, Jochen Kummerow described the functional balance between root and shoot growth in chaparral shrubs and how the balance changes with water stress.

The papers taken together demonstrate new and important areas of research needed to predict more precisely the long-term effects of management on the vegetation of Mediterranean regions. An important topic omitted in much of the literature on Mediterranean-type ecosystems is the demography of shoots on the individual shrub, a domain which links the growth measurements with whole plant demography. The modeling of demographic and physiological concepts should be completed as soon as possible and should add completeness to the understanding of the dynamics and management of Mediterranean-type ecosystems.