

# FIRE IN ECOSYSTEM DYNAMICS

Mediterranean and Northern Perspectives

Edited by

J.G. Goldammer and M.J. Jenkins

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## PREFACE

The problems and negative impacts of uncontrolled wildfires are increasing worldwide. In recent years in the Mediterranean region the number, size and intensity of fires has been steadily growing. During the extremely dry fire season of 1989, for example, about 20 000 wildfires affected a total of more than 380 000 hectares of land in Spain, among which c. 152 000 ha were forest land. A similar picture is given by the data from France (c. 70 000 ha), Portugal (c. 77 000 ha), Italy (c. 85 000 ha) and Greece (c. 37 000 ha). What explanations can be given for the escalating wildfire problem?

In the Mediterranean there are few landscapes which have not been altered by the human activities of grazing, cutting, coppicing, terracing and burning. Many of these traditional practices, established in the mid-Pleistocene, have been abandoned or more or less altered in recent years. Human burning for pastorage, hunting, cooking, heating and vegetative manipulation have decreased, altering patterns evolved over hundreds of thousands of years. The long history of burning in the Mediterranean is well documented in the introductory paper of this volume. One outcome of this altered pattern of human activity has been a general increase in the amount and flammability of wildland fuels. In Galicia *Ulex* species were extensively harvested by farmers for use as fertilizer until the 1950's when chemical fertilizers became available. The consequent expansion in this highly flammable fuel type has contributed greatly to the wildfire problem. An additional significant factor has been the extensive establishment of pine and eucalyptus plantations for sawlog and pulpwood production. These highly flammable monocultures have sustained many of the large wildfires in recent years.

An important element in the wildfire problem has been the unprecedented occurrence of human-caused arson fires. Some say that as many as 95% of the fires in 1989 were deliberately set. The specific reasons for such ignitions are difficult to determine, but must surely, in many cases, involve a profit motive. Individuals studying such problems point to the reduced costs of fire-charred stems for mills or the availability of burned lands for construction of resort facilities in tourist areas. Revenge or grudge fires by people dissatisfied by government establishment of plantations and suppression of traditional practices may also play a role in the arson fire problem.

The adverse effects of these unwanted fires are obvious. Papers presented in this volume examine in detail fire effects on soil, especially erosion and nutrient losses in Spain, Italy, France and Israel. Papers from Eastern Canada and South Africa add valuable insight into the problems as viewed from other continents.

The other main focus of the papers presented here is vegetative succession in *Quercus* ecosystems in Spain and France; shrub communities in northwest Spain and Italy; and fire effects in pine plantations in Portugal.

Solutions to the problem are difficult to find. Experience in the United States, Canada and Australia have demonstrated the negative impacts of fuel accumulation. Many researchers recognize the need for prescribed fire programs aimed at

hazard reduction and are meeting and sharing information focusing on this approach. It is encouraging that scientists are taking advantage of information and techniques on fire behavior predictions, fuel modeling, and fire danger forecasting developed on other continents. Other research is underway investigating demographics and the sociopsychological reasons for arson fires.

A new challenge in wildland fire science and fire ecology is ahead of us. In Asia the northeastern territories of China and the Soviet Union with an apparent long history of fire are now experiencing major conflagrations. Extensive burning is entering the remote forest biomes between the tropical moist lowlands and the high altitudes of the Himalayas. The growing size of fire-affected land and the amount of biomass burnt is greater than it ever was in human history. It has recognized influence on global climatic patterns. Vice versa, global climate changes, through effects on vegetation and through expected increase of extreme droughts, will have important impact on wildland fire regimes.

It is becoming more and more obvious that the concern about the impact of wildfires goes beyond national boundaries. In 1977 the Volkswagen Foundation (Federal Republic of Germany) sponsored the first of a series of Symposia on Fire Ecology held at Freiburg University, Federal Republic of Germany, in order to establish a communication platform for European wildland fire scientists. The Third International Symposium on Fire Ecology was again sponsored by the Volkswagen Foundation and was held in May 1989 at Freiburg University.

The contributions of the first part of the symposium are presented in this volume and focus on Mediterranean vegetation, but are supported by research expertise from other vegetation zones in our attempts to portray the global nature of changing wildfire regimes and wildfire impacts. The results of the second part of the symposium which focused on the rôle of fire in the tropical biota and in global ecological processes are published in a different volume.\*<sup>1</sup>

I highly appreciate the cooperation of Michael J. Jenkins who joined me as co-editor during his stay as visiting professor at Freiburg University.

This book is dedicated to Jean-Pierre Vité, Head of the Institute of Forest Zoology at Freiburg University, who has supported research in fire ecology in Europe and particularly at Freiburg University from the very beginning.

Freiburg, December 1989

*Johann Georg Goldammer*

\*1. J.G. Goldammer (ed.) 1990. Fire in the tropical biota. Ecosystem processes and global challenges. Ecological Studies 84, Springer-Verlag, Berlin - New York (in press).