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Ecological bases for coexisting with forest fire in the Mediterranean Region – Decalogue

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In our society there is a certain tendency to view forest fires as disasters to be avoided at all costs, given that they destroy our ecosystems. This idea has also been adopted by many managers of wildlands and protected areas. Nevertheless, the large budgets allocated to fire suppression have not been able to prevent forest fires either in Spain or in countries with far greater economic resources, and this raises doubts regarding not only the effectiveness of the current programmes but also the very premise on which they are based. On the other hand, there is a large body of evidence suggesting that forest fires have always occurred and that they do not necessarily result in ecological disasters if viwed at the appropriate scale. This new vision requires changing the paradigm and adaptating it to the management and restoration of our ecosystems. With this aim, we propose the following 10 points, which we hope will both stimulate discussion and contribute to a better definition of the management priorities for our ecosystems.

1. In the Mediterranean Basin, forest fires are natural processes which would be mainly generated by lightning (e.g., during dry thunderstorms in summer) in the absence of human intervention and which are favoured by the seasonality of the mediterranean climate. Their repeated occurrence over millennia has helped to forge the biodiversity of this Basin (Pausas & Verdú 2005, 2008; Verdú & Pausas 2007). Moreover, at the global scale, the Mediterranean Basin is considered a biodiversity hotspot, along with other fire-prone ecosystems (California, South Africa, Southwest Australia) (Myers 2000).

2. Forest fires, even large forest fires, are not always ecological disasters. The perception of forest fires as ecological disasters corresponds to a static and limited vision of nature. Nevertheless, it is also true that in conditions of global change and inadequate management and in combination with other past and present disturbances, fire regimes injurious to biodiversity can be generated (Pausas et al. in press).

3. Forest fires have occurred in the past, and they will continue to occur in the future. Global climate change may alter the characteristics of the fires (Pausas 2004). But it is neither reasonable nor possible to eliminate forest fires from mediterranean ecosystems. Partial (temporal) elimination of forest fires may generate more destructive fires. We should learn to coexist with forest fires in a sustainable way, and not aspire to eliminate them.

4. As a result of their millenary use, many Mediterranean landscapes currently show reduced resilience (capacity to respond to disturbances). Wildland management should be focussed on increasing this resilience.

5. Due to recent changes in the use and management of the landscape, the natural fire regimes have been altered and more destructive fires have been produced. Some areas that were traditionally subjected to frequent fires of low severity are now subjected to infrequent but high-intensity fires (e.g., some coniferous communities; Fulé et al. 2008).

Other areas are perfectly adapted to infrequent, high-intensity fires (garrigues, maquias), and an increase in frequency may threat them. Lastly, some circum-Mediterranean forest areas which had sustained very few fires in the past, have been affected by large fires in the last decades. It is necessary to restore and adjust the fire regimes so that they fall within ecologically acceptable ranges. Some of these ranges are unknown and require thorough study prior to taking appropriate management steps.

6. There are already various landscape management methods and tools for reducing the impact of a fire, i.e., for reducing soil erosion and facilitating the regeneration and recolonization of the species affected. These methods are applied both before a fire (vegetation, fuel and landscape management) and after a fire (restoration techniques such as soil protection, seed sowing, outplanting, etc.), and they should be adapted on a site-specific basis and not in a generalized way over the whole burnt area (Vallejo et al. 2006).

7. Restoration is a slow process; short-term results should not be expected. All restoration management requires medium and long term scientific evaluation and monitoring (adaptive management and continuous learning). All reforestation projects in fire-prone areas, especially at the urban-wildland interface, should also include in their conception the principles of fire prevention.

8. In the same way that there are restrictions and codes with respect to urban planning and housing construction in areas under seismic, volcanic and flood risk, there should also be restrictions and codes that regulate urbanization and construction in fire-prone areas.

9. Mediterranean landscape management should be aimed toward sustainable coexistence with forest fires, in terms of both human security and ecological processes/ biodiversity.

10. A fire management plan that is based solely on physical properties (fuel amounts and properties, propagation models, etc.) is doomed to failure. The ecological and social processes involved must also be taken into account (Pyne 2007). Fire management (prevention, extinction, restoration) must be evaluated in terms of long-term costs, benefits and damages.

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[Note: Pausas' papers are available at: http://www.uv.es/jgpausas]