

WILDFIRES AND BIODIVERSITY

Mireia Costa Perea - University of Barcelona, Università degli Studi di Milano

In Spain, in the first five months of this year, forest fires have devastated a total of 46,784.98 hectares of land, almost three times more than in 2022 (16,496.88 ha). In the Italian territory, about 160,000 hectares were affected in 2021, although in 2022 it decreased to 68,510 hectares, in this 2023 a worse season has been predicted and the 2023 Anti-Fire Campaign is being implemented. The heat wave has put the European Union on alert, deciding to double the fleet of fire-fighting aircraft this year, especially in southern countries such as Spain, Portugal, and Italy. Faced with a situation that worsens as the years go by, the consequences that these events affect not only the human population, but also biodiversity and the territory must be considered. In this article we will discuss the effect of fires on plant biodiversity and how a territory can be valued according to its resistance to fire in order to implement measures to improve the situation.

Fires in ecology are referred to as disturbances, meaning a change in the initial environmental conditions that causes a drastic change in the ecosystem. It is true that there are ecosystems such as pine forests that are accustomed to disturbances, in fact, they are necessary for the ecosystem as part of its life cycle. Fire consumes excessive biomass, affects forest composition and structure, and affects hydrological and nutrient cycles. But, above all, disturbances provide the opportunity for new species to appear, evolving the ecosystem, making it more complex. As we can see in *Figure 1*, which shows the vegetation dynamics of an ecosystem, tending towards complexity.

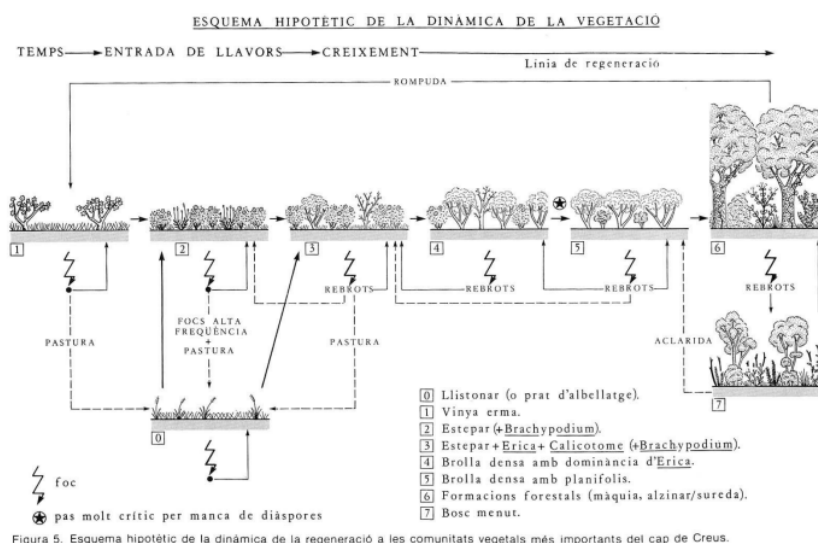


Figure 1: Hypothetical diagram of vegetation dynamics [Image].

In the words of Paracelsus, the 16th century alchemist, "the dose makes the venom". If a disturbance becomes repetitive or very prolonged over time, the ecosystem is damaged. Ecosystem productivity will be lost (such as timber production), ecosystem services will be lost (by losing plant individuals, affecting pollination, improved air and soil quality, etc.), fauna and flora will be lost, a high production of CO₂ (a greenhouse gas that worsens air quality) will be generated, a risk of desertification and soil erosion will be created, as well as the possible entry of invasive species (which are easy to spread and have a negative effect on other species).

In order to evaluate whether an ecosystem is resistant to forest fires, it has been decided to follow three different parameters: the type of ecosystem, the type of plant species that make up the ecosystem and the fire prevention measures in place.

The first factor is to distinguish whether the ecosystem has a high number of species or whether it is a single-species crop. This is the case with cultivation, which, because of the distance between individual plants, leaves soil exposed to the sun, drying it out and helping fires to spread rapidly. In contrast, a forest that creates its own humid climate, with more plant species covering the ground, with branches in all the levels... makes the advance of a forest fire slower and more difficult.

The second factor would be to distinguish between the plant species in the ecosystem, as there will be vegetation that is more flammable, unlike other plants that have adaptations to resist fire such for example leaves with high amounts of water, protected stems, thick bark, or that after the fire it is easier for them to regenerate because the roots or the stem have survived or because this species generated at the time numerous seeds or that are resistant to fire. Species such as the Strawberry tree (*Arbutus unedo*) or the Mediterranean Heather (*Erica multiflora*) or the Kermes Oak (*Quercus coccifera*) are some examples of species that are resistant to this type of disturbance.

The last factor is the implementation of fire-fighting techniques either by the farmer, the landowner, or the jurisdiction. Techniques such as natural or artificial firebreaks (areas that have no vegetation and therefore the spread or generation of fire is not possible), activities such as clearing and alternatives to burning, extraction of dead biomass, avoiding the use of fuels, if the farmer carries out controls and early detection of the fire, if there is education, awareness-raising and restoration activities after the fire has been extinguished. An example would be a new firefighting technique applied in Spain, which uses extensive livestock farming to control the growth of vegetation and reduce the potential fuel for a fire, to break the continuity of vegetation and make it more difficult for the fire to spread. In fact, a difference is made between goats and bovines, giving priority to goats because their feeding on more fibrous or lignified vegetation reduces the dry matter that is more prone to burn and improves the herbaceous vegetation, while bovines feed basically on green leaves.

The following *Figure 2* shows an example of cataloguing according to the three factors outlined above, with priority given to high biodiversity, the presence of fire-resistant plants and the application of fire prevention measures.

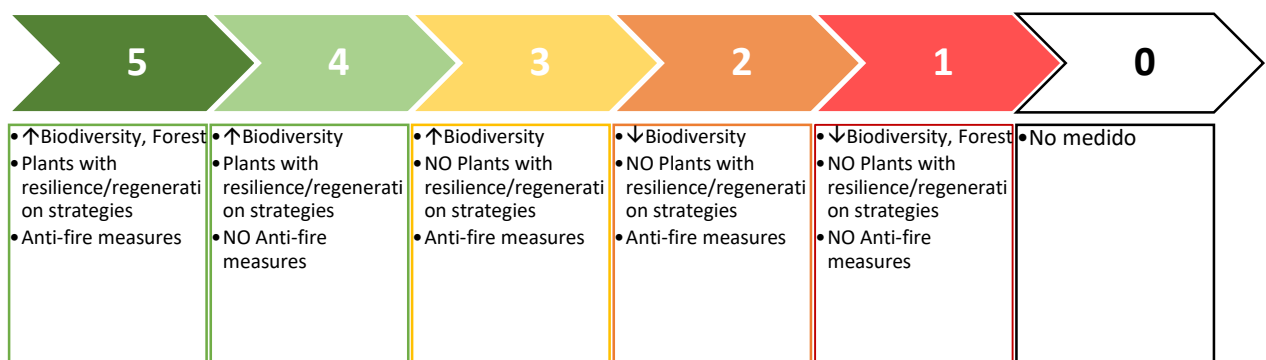


Figure 2: Example of fire resistance values according to biodiversity, resistant plant species and fire protection measures [Graphic] Author's own elaboration.

WEBGRAFIA:

- Maisto, D. (2023, June 9). *Incendi, prevenzione e monitoraggi: come l'Europa si prepara all'estate 2023*. *QuiFinanza*. <https://quifinanza.it/green/incendi-prevenzione-e-monitoraggi-come-leuropa-si-prepara-allestate-2023/720954/>
- Facchini, A. (2023, July 7). *Gli incendi in Italia sono sempre più virulenti ma si fa poca prevenzione*. *Valigia Blu*. <https://www.valigiablu.it/crisi-climatica-emergenza-incendi-italia-prevenzione/>
- L. Hernandez (2022) *Pastoreo contra incendios. Propuesta de WWF España para adaptar el territorio al cambio climático*. WWF España
https://wwfes.awsassets.panda.org/downloads/2022_pastoreo_contra_incendios.pdf
- Euronews. (2023, July 17). *La ola de calor aviva los incendios en Europa*. *Euronews*.
<https://es.euronews.com/2023/07/17/nuevos-en-incendios-en-el-sur-de-europa>
- *Incendios forestales, en datos, estadísticas y cifras*. (n.d.).
<https://www.epdata.es/datos/incendios-forestales-datos-estadisticas-cifras/267>