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Mapping the distribution of *Abies marocana*: geospatial reference data for biogeographical research and conservation

Oliver Gutiérrez-Hernández

One *Abies marocana* Trab. (Moroccan fir) is the southernmost fir species within the circum-Mediterranean group. It is endemic to the northern Rif Mountains, in the northwesternmost part of the Maghreb (Morocco), and is closely related to *Abies pinsapo* Boiss. (Spanish fir), which is distributed in the southern Iberian Peninsula, in the westernmost part of the Baetic ranges (Spain). Although its taxonomic delimitation has been discussed, recent studies support its distinction from *A. pinsapo*. (Ben-Said, 2022; Dering et al., 2014). Unlike the latter, *A. marocana* has received limited scientific attention and remains poorly understood from a biogeographical perspective.

The Moroccan fir is threatened by multiple pressures, including wildfires, logging, overgrazing, and the expansion of cannabis cultivation, which have progressively contributed to habitat fragmentation (Ben-Said & Sakar, 2023). The growing impact of climate change compounds these threats. As a result, *A. marocana*, like *A. pinsapo*, is classified as “Endangered” on the IUCN Red List of Threatened Species. Despite this situation, available information on the distribution of the Moroccan fir is not easily accessible and often lacks temporal continuity, updates, or high resolution. This gap limits understanding of its environmental and spatiotemporal dynamics and hinders the design of effective conservation strategies. In addition, there is a need to harmonise data across the Baetic-Rifan fir forests, which share similar environmental settings and common threats, within a unified biogeographical framework.

This contribution shows a multitemporal and thematically structured geospatial database focused on *A. marocana*. It includes a reconstruction of its distribution from 1940 to the present, as well as a high-resolution reference map for 2025. Furthermore, in the absence of detailed local climatic data, a statistical downscaling technique based on the geographically weighted regression (GWR) was applied to WorldClim bioclimatic variables to improve habitat characterisation. This work provides a geospatial foundation for future biogeographical research and conservation efforts. Overall, it serves as a roadmap for further study of the Baetic-Rifan fir forests within the framework of the Intercontinental Biosphere Reserve of the Mediterranean.