

LETTERS



Cannabis farming has expanded in Morocco's Talasemtane National Park, a biodiversity hotspot.

Edited by Jennifer Sills

Moroccan cannabis farms threaten biodiversity

Talasemtane National Park, located in Morocco's Rif region, is part of the Intercontinental Biosphere Reserve of the Mediterranean (1) and is on the United Nations Educational, Scientific and Cultural Organization (UNESCO)'s list of tentative world heritage sites for future nomination (1). Agricultural activities in the region predated the park's establishment and have continued to take place legally within its borders. However, Morocco must address the recent expansion of cannabis (marijuana) farms, which put the park's biodiversity at risk.

A biodiversity hotspot (2), Talasemtane National Park features diverse ecosystems, primarily natural coniferous forests with patches of rare tree species, including the Moroccan fir (*Abies marocana*, a subpopulation of *Abies pinsapo*), which is endemic to the park, and the Atlas cedar (*Cedrus atlantica*), which is endemic to North Africa. Both of these species have been designated Endangered by the International Union for Conservation of Nature (3, 4) and hold high evolutionary value (5, 6). The park is also home to a range of endangered fauna, including the iconic Barbary macaque (*Macaca sylvanus*) (7).

Small villages within the park have traditionally cultivated various crops, including cereals and cannabis, but in recent decades, there has been a shift toward large-scale cannabis monocultures

(8). Farmers expand cannabis cultivation by burning forests and clearing native vegetation. Slopes are sometimes flattened or terraced before cultivation, which exacerbates land degradation. As a result, the park lost 2850 ha of forest (4.8% of the park) between 2001 and 2018 (9); between 1995 and 2020, the park lost 2979 ha of forest (5% of the park) (10). Intentionally set fires often spread beyond the planned cultivation area, and burned areas are used to expand cannabis crops further. Forest fires burned 4440 ha (7.5% of the park) between 2001 and 2018 (7).

Current deforestation trends in the Talasemtane National Park vastly outpace traditional practices. To protect biodiversity in the region, the Moroccan National Agency for Water and Forests should enforce strict regulations, including sanctions when needed, to halt the expansion of cannabis plantations. The agency should also restore forests that have been illegally destroyed. Clarifying land ownership and establishing a supervisory committee would help ensure proper implementation of these actions. In addition, diversifying the local economy through initiatives such as ecotourism could reduce reliance on forest resources and improve livelihoods.

Brahim Chergui¹, Soumia Fahd¹, Xavier Santos², Juli G. Pausas^{3*}

¹Laboratoire Ecologie, Systématique, Conservation de la Biodiversité, Unité de Recherche Labellisée Centre National de Recherche Scientifique et Technique N° 18, Faculté des Sciences, Abdelmalek Essaadi University, Tétouan, Morocco.

²Centro de Investigação em Biodiversidade e Recursos Genéticos, Campus de Vairão, Universidade do Porto, 4485-661 Vairão, Portugal.

³Centro de Investigación sobre Desertificación, Consejo Superior de Investigaciones Científicas,

Universitat de València, Generalitat Valenciana, 46013 Moncada, Valencia, Spain.

*Corresponding author. Email: juli.g.pausas@csic.es

REFERENCES AND NOTES

1. A. Aoulad-Sidi-Mhend *et al.*, *Geoheritage* **11**, 1005 (2019).
2. E. M. Valderrábano, T. Gil, V. Heywood, B. d. Montmollin, Eds., "Conserving wild plants in the south and east Mediterranean region" (International Union for Conservation of Nature, 2018).
3. IUCN Red List, *Cedrus atlantica*; <https://www.iucnredlist.org/species/42303/2970716>.
4. IUCN Red List, *Abies pinsapo*; <https://www.iucnredlist.org/species/42295/10679577>.
5. J. C. Linares, *J. Biogeog.* **38**, 619 (2011).
6. M. Ben-Said, E. H. Sakar, *Folia Geobot.* **58**, 31 (2023).
7. IUCN Red List, *Macaca sylvanus*; <https://www.iucnredlist.org/species/12561/50043570>.
8. P.-A. Chouvy, J. Macfarlane, *Intern. J. Drug Policy* **58**, 85 (2018).
9. I. Castro *et al.*, *Fire* **5**, 51 (2022).
10. Z. Beroui, 2020. "Contribution à la mise en place d'un système de suivi écologique de la biodiversité des écosystèmes forestiers du Parc National de Talasemtane (Rif Occidental, NO Maroc) [in French].", Memoire de 3ème cycle (Ecole Nationale Forestière d'Ingénieurs, 2020); https://drive.google.com/file/d/17SmN_rddlojLXDZjU-ONkjM-VHo5sWPB/view.

10.1126/science.adq5140

Safeguard the endemic species of Honduras

The Swan Islands, three remote islands in the Caribbean Sea, are home to several endemic species. In 1991, the islands were designated as the Abogado Agustín Córdoba Rodríguez Marine National Park (1). However, the Honduran Naval Force has custody of the islands (1), and researchers are often denied access to them (2). The Honduran government is now moving forward with plans to establish a correctional facility for prisoners within the park's