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Conference Abstract

Historical ecology of Portuguese dunes afforestation: the introduction and spread of an invasive alien plant

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Abstract

From the late 18th century, several countries implemented dune stabilization and afforestation programs using fences and vegetation to control sand drift. In Portugal, afforestation was assured by the Forestry Services since 1886, who mainly used *Pinus pinaster* complemented with native and alien species. The Australian *Acacia longifolia* was one of the species sown and grown in the dunes and nurseries, later revealing invasive behavior. This study reports the historical pathway of *A. longifolia* introduction, establishment and spread in 23 forested areas along a 180 km coastal stretch, under the Portuguese forest regime. Foresters' reports, management plans and distribution maps from 1852 onwards were reviewed. The evidence gathered supports that *A. longifolia* was likely introduced after 1897 at São Jacinto and Gafanha dunes. Following several

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years of experimentation and trial, *A. longifolia* was recommended for sand dune afforestation in 1905. Its first use was reported in Mira by 1919 for the stabilization of drainage ditches, and by 1948 nearly 12 000 ha of central coastal dunes had been sown and/or planted with this species. The current distribution of *A. longifolia* reflects both its use continuing until at least 1955, and the major role of disturbances as triggers for its expansion. A major windstorm in 1941 may have facilitated its spread in affected areas where it was already present, and its introduction to other forested areas. Wildfires in the 1990's triggered its rapid expansion, promoting a landscape shift towards an *A. longifolia*-dominated shrubland. The earliest record of invasive behavior is from 1983 and the species was legally listed as such in 1999 (DL 595/99). Eighty-five years after it was introduced in coastal dunes, *A. longifolia* management has become much more difficult due to a 1000-fold increase in the number of seeds m^{-2} in the seedbank. This highlights its invasive potential in Portugal. The factors influencing the species' current distribution and status are discussed.

Keywords

dune stabilization; historical plantation; invasive alien species; propagule pressure; sowing, species selection; temporal trend

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Conflicts of interest

The authors have declared that no competing interests exist.