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Conference Abstract

Biocontrol in action: impact of *Trichilogaster acaciaelongifoliae* on *Acacia longifolia* seed dynamics in Portuguese coastal dunes

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Abstract

Acacia longifolia (Andrews) Willd., an Australian tree introduced to Portugal for dune stabilization in late 19th century, has become a widespread invasive plant that severely impacts biodiversity and ecosystem services. Its success is mainly attributed to its ability to produce and accumulate persistent seed banks. Conventional physical and chemical management is often prohibitively expensive and provides only short-term suppression. To address this, the Australian bud-galling wasp *Trichilogaster acaciaelongifoliae* (Froggatt) (*Hymenoptera: Pteromalidae*) was introduced in 2015 as a biological control agent to reduce the plant's massive reproductive output. This study evaluates the long-term impact of *T. acaciaelongifoliae* on *A. longifolia* seed dynamics at several coastal dune sites in central Portugal. Annual seed rain was quantified over five to six years (2019–2024) using seed intercept traps, while seed bank replenishment since introduction was assessed through soil and litter sampling. Cover by *T. acaciaelongifoliae* galls increased significantly over time, reaching a "tipping point" five years after release. This resulted in a reduction in annual seed rain that reached up to

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98.1% in some of the areas. The increase in galls induced physiological stress on the host plants, causing a significant rise in phyllode abscission, and eventually plant mortality. While the overall seed bank still increased gradually between 2015 and 2024, replenishment began to stabilize in areas where the biocontrol agent had been established for more than six years. Mechanical control and wildfire events were found to enhance seed bank depletion, especially when integrated with the sustained presence of the biocontrol agent.

The results demonstrate that *T. acaciaelongifoliae* effectively suppresses the reproductive potential of *A. longifolia* and slows the accumulation of its persistent seed bank. These findings highlight the importance of adopting an integrated management strategy – combining biocontrol with conventional methods – to ensure the sustainable restoration of invaded coastal habitats in Portugal.

Keywords

Coastal dunes; Gall wasp; Management of invasive plants; Monitoring of biological control agents; Seed bank legacy; Seed rain;Sustainability of invasive species management

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Conflicts of interest

The authors have declared that no competing interests exist.