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Contrasting Response to Drought and Climate of Planted and Natural Pinus pinaster Aiton Forests in Southern Spain

编号	010019702
推送时间	20190729
研究领域	森林生态
年份	2019
类型	期刊
语种	英语
标题	Contrasting Response to Drought and Climate of Planted and Natural Pinus pinaster Aiton Forests in Southern Spain
来源期刊	Forests
期	第197期
发表时间	20190722
关键词	climate change; dendroecology; drought; forest decline; maritime pine;
摘要	Reliable estimates of tree growth and wood yield are fundamental to support the management of restored forests and better reconcile the objectives of recovering biodiversity with the provision of ecosystem services. In this study, wood standing volumes and tree biomass stocks were estimated in different ecological restoration systems and at two sites with contrasting soil fertility, in order to evaluate the potential trade-offs between biodiversity and forest production. At each site, a complete randomized block design, with three replications of six treatments, was established in 1997–1998: direct seeding (DIRS), high-diversity tree plantation (HDIV), modified “Taungya” agroforestry system (AFS), mixed plantation with timber and firewood species (MIX), managed agroforestry system (AFSm) and managed mixed plantation (MIXm). We inventoried all trees with diameter at breast height (DBH) ≥ 5 cm in 450 m2 per treatment per plot, 19–20 years after establishment, using site-specific allometric models. Significant site effects were found for tree height, tree density and wood volume. Restoration systems (treatments) affected forest structure and forest productivity. Higher wood stock and biomass tree were observed in the less complex system (DIRS), while AFSm and HDIV reconciled higher species richness and diversity with good wood volume yields and tree biomass.
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