

Supplementary Material

Spatially variable recruitment response to fire severity in golden-top wattle (*Acacia mariae*, family: Fabaceae), a thicket-forming shrub of semi-arid forests

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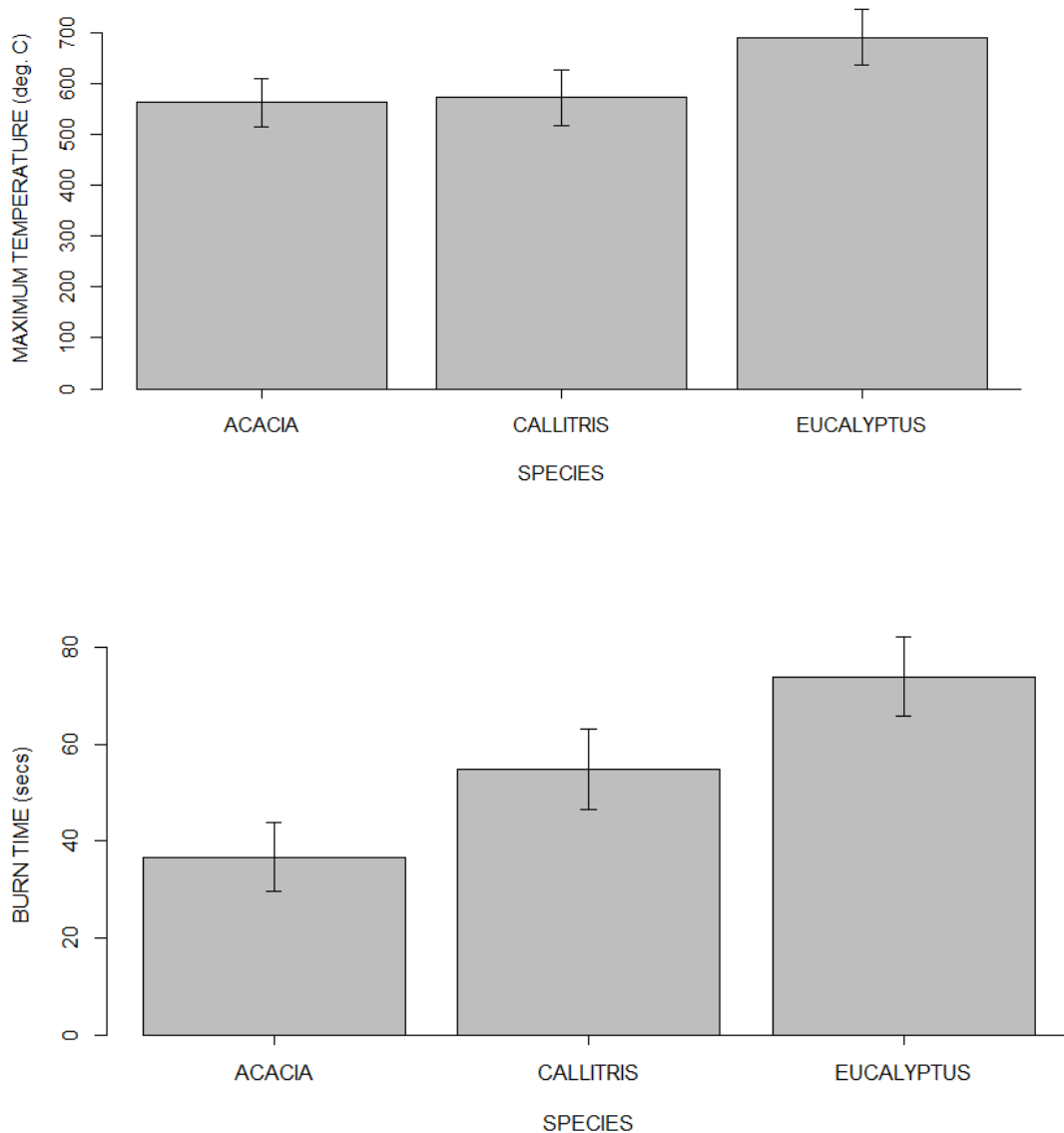
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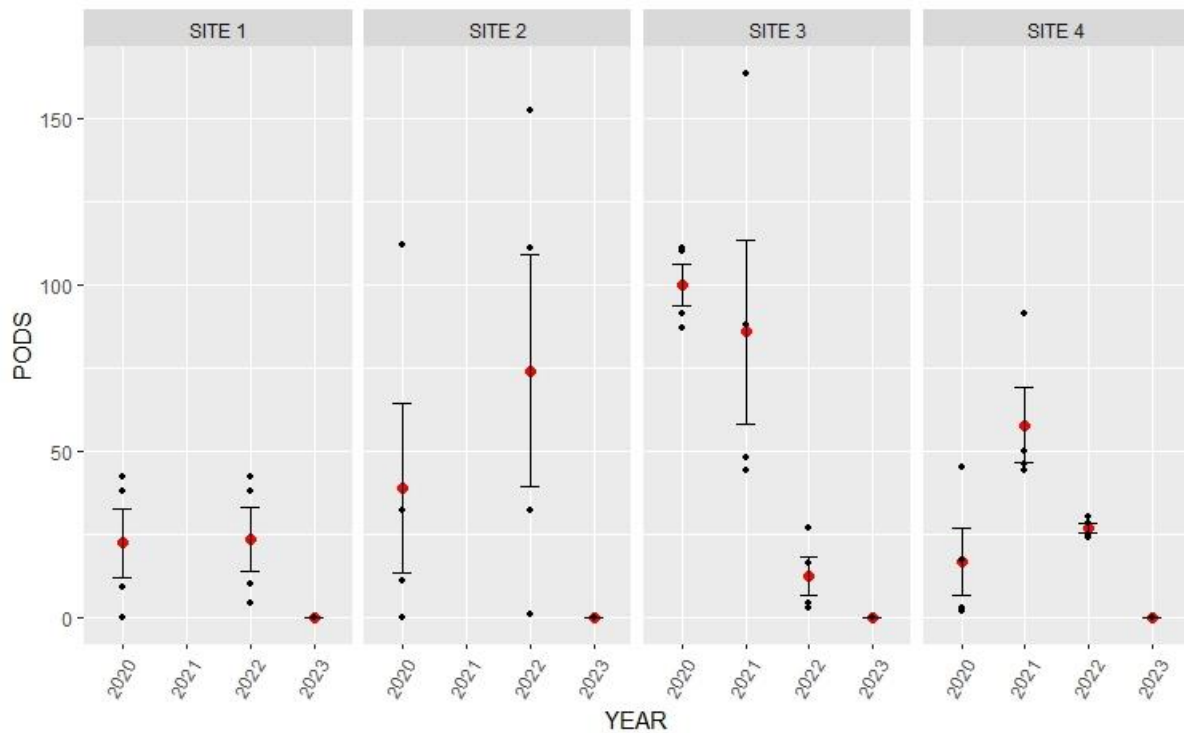
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Appendix Fig. S1. Bar charts of flammability parameters of three plants (*Acacia mariae*, *Callitris glaucophylla* and *Eucalyptus crebra*) from the Pilliga forest. Flammability parameters tested using plant BBQ device. Ten replicate shoot samples (one sample per individual plant, taken from ten plants) were collected for each of the ten target species in August 2023. Flammability assessments were carried out using a plant ignitability apparatus developed following the methodology of Jaureguiberry et al. (2011). Briefly, the apparatus comprised an 85 × 60 cm metal drum with a volume of 210 L, bisected along its length. One of the resulting halves was affixed horizontally onto a steel support, while the other half was hinged to the secured portion to serve as a windbreak during the combustion experiments. A handheld blow torch was activated for a period of 10 seconds, directed towards one extremity of the shoots. The various parameters that were measured during the experiment included: 1) the peak temperature attained by the combusting specimen after deactivating the blow torch, determined using a Fluke™ 572-2 infrared thermometer gun capable of sensing temperatures up to 1200°C; 2) the time taken for a specimen to completely extinguish post-deactivation of the burner.



Appendix Fig. S2. Counts of pods collected from leaf litter samples (200x 200 mm) beneath unburnt *A. mariae* shrubs across 4 sites in the Pilliga forest between 2020 and 2023. No data are available for sites 1 and 2 for 2021.

Methods for reproduction study

Annual reproductive output of *A. mariae* shrubs was assessed at the population level by evaluating changes in pod (seed pod) density in shrub litter layers at sites 1-4 of the 'recruitment' study. Specifically, at each site pods were enumerated from the litter layers of two 200 × 200 mm square quadrats positioned beneath four randomly selected shrubs. The positioning of these quadrats changed each year, with 15 cm camping pegs being inserted into the ground whenever a quadrat was sampled to avoid re-sampling the same litter patch beneath each shrub. Sampling occurred during winter months of all years between 2020-2023. However, in the 2021 sampling round it was not possible to obtain data from sites 1 and 2 as road access to these sites was prevented due to wet weather. Pods from the most recent spring were easily distinguishable from those of preceding years, as the older pods exhibited visible signs of deterioration and lacked the fresh burgundy colouration characteristic of the more recently produced pods.

The method of counting pods in the litter as a proxy for reproductive effort was selected for its efficiency, and because its validity was supported by previous studies that have established strong correlations between similar indirect measures of seed production (e.g., flowering intensity or visual

seed surveys) and actual seed production during seeding events (Nakajima 2015; Perry and Hill 1999; Suzuki *et al.* 2005). It is acknowledged that there could be no certainty with this sampling that the pods found had contained viable seeds. However, the data obtained from the sampling would at least give an indication of how reproduction might vary year-to-year and across regions within the forest. During the initial pod sampling round, information was collected for each shrub concerning shrub height, girth (basal diameter measured at 30 m above ground), and canopy diameter.