

The ecology and determinants of successful invasion by a native Australian tree *Acacia longifolia* subsp. *longifolia* (sallow wattle) in south-eastern Australia

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Summary *Acacias* are some of the most successful and detrimental global invaders. Their impacts on ecosystems are often substantial, long-lasting and irreversible. The Australian native tree *Acacia longifolia* (Andrews) Willd. subsp. *longifolia* is currently recognised as a significant invasive species both within Australia and abroad. While *A. longifolia* has been extensively studied overseas, within Australia there has been little work undertaken to determine its impact. In 2014, we investigated the impacts of *A. longifolia* on above and belowground vegetation in Grampians National Park (GNP) in south-eastern Australia, and found that *A. longifolia* is altering vegetation structure and composition to the detriment of native species. More specifically, above ground, increasing cover of *A. longifolia* is gradually transforming diverse open herb-rich woodland to densely populated closed shrubby woodland with limited diversity. Below ground, by contrast, the soil seed bank indicated that

although there were some minor changes from the original state, overall the seed bank consisted largely of ruderal annual and short-lived perennials, particularly graminoids and forbs. Nevertheless, we still have very little understanding of the factors which drive invasion success. There is unlikely a single mechanism facilitating the invasion process. We are undertaking research to identify the mechanisms which enhance the invasiveness of this species in order to improve long-term management in the GNP. We aim to (1) determine which environmental factors are facilitating the species, (2) compare plant functional traits and genetic differences between *A. longifolia* within the home and invaded ranges, and (3) determining the competitive ability of the species with functionally similar native species under future climate change scenarios.

Keywords *Acacia*, biological invasion, competition, climate change, drought, phenotypic plasticity, genetic variation, physiology.