Understanding soil microbial community shifts in response to fire and weed invasions in urban *Banksia* woodlands

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Urban bushland fragments in the Perth metropolitan area are under an ever-increasing amount of threat, with encroaching development and the changing climate being so severe, it has been classified as endangered [1]. How this ecosystem will be affected by these pressures is not well understood as parts of the community and their interactions have never even been described. For a 'global biodiversity hotspot' [2] not much is known about Western Australia's soil microbiota and how it influences the plant community, and therefore surprising outcomes could occur when environmental variables are changed. The difference in seasons is set to become even more stark with drier hotter summers and higher incidences of 'freak weather events' (such as droughts and wildfires) [3][4], so more knowledge is required to accurately manage the ecosystem for it to stay as diverse as it is. This study set out to quantify and describe the soil microbial community and whether it is influenced by Fire regime (Time since fire, fire type, ignition month, etc.) and how this affects (or is affected by) the plant community. Collecting soil samples and undertaking plant surveys would allow for a description of the soil microbial diversity (via PCR and DNA analysis) [5] and begin to fill a knowledge gap, but also quantify how fire regime changes the soil microbia composition and thus how this influences the prevalence of symbiotic plants species, with further implication for invasion risk from non-native plants.

However, there are chances to resist invasion, as if the native soil microbia are not compatible with the invasives, then they will be less fit and could be outcompeted by the native species [6][7].

1. Threatened Species Scientific Committee (2016). Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community. Canberra: Department of the Environment and Energy. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/131-conservation-advice.pdf. In effect under the EPBC Act from 16-Sep-2016
2. Myers N, Mittermeier RA, Mittermeier CG, da Fonseca GAB, Kent J (2000) Biodiversity hotspots for conservation priorities. Nature, 403: 853-858.
3. Kottek M, Grieser J, Beck C, Rudolf B, Rubel F (2006) World map of the Köppen-Geiger climate classification updated, Meteorologische Zeitschrift, 15, 259-263.
4. IPCC (2014) Summary for policy makers. In: Climate change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (eds Pachauri RK, Meyer LA, Allen MR), pp. 2-26, IPCC, Geneva, Switzerland
5. Fierer N, Jackson JA, Vigalys R, Jackson RB (2005) Assessment of Soil microbial community structure by use of taxon-specific quantitative PCR assays. Applied and Environmental Microbiology, 71: 4117-4120.
6. Dawson, W. , Schrama, M. and Austin, A. (2016), Identifying the role of soil microbes in plant invasions. Journal of Ecology, 104: 1211-1218.
7. Keeley, J.E., 2000. Fire and invasive species in Mediterranean-climate ecosystems of California. In Proceedings of the invasive species workshop: the role of fire in the control and spread of invasive species. Fire Conference(pp. 81-94).

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