

PhD Project: opportunity for a student

Resource allocation strategies in disturbance prone environments: sprouting behaviour, carbohydrate storage and the persistence niche

Background Plant dynamics in many Austral biomes, including those of tropical savannas, are driven mainly by fire. Tropical savannas may also be severely disturbed by cyclones. Many woody plants persist in these systems by resprouting after disturbance (asexual reproduction), but this is generally at the expense of sexual reproduction, and thus seedlings are infrequent and gene flow limited. Sprouting behaviour, resource storage and allocation patterns, and the trade-offs between asexual and sexual reproduction have not yet been incorporated into models of savanna dynamics.

The Australian tropical savannas offer great potential for carbon sequestration by management of fire, useful in combating climate change whilst providing economic benefits for conservation. This potential may be diminished by increased frequency or intensity of cyclones. The implications of resource allocation strategies in savanna trees for carbon storage, and how these may be altered by changes to fire regimes, is unknown and critical to the management of these ecosystems.

Project aim: to determine the importance of resprouting for the future of savannas in northern Australia. Specific aims are to examine:

1. the relationship between sprouting response and the severity of environmental disturbances, especially fire and storm damage;
2. the ecophysiology of resource allocation (non-structural carbohydrates) and storage (accumulation and/or reserve formation) in sprouters under different disturbance regimes;
3. the trade-off between sprouting and sexual reproduction and how vegetative recruitment affects tree dynamics and composition, woody thickening and carbon sequestration; and
4. to develop demographic and process-based models of sprouting behaviour and the importance of the sprouting strategy in maintaining mesic savanna communities in response to changes in fire regimes, grazing, cyclone activity and climate.



The research will be conducted in three national parks in northern Australia.

Resources Some operating funds are available. Successful application is conditional on obtaining an Australian or International postgraduate study award to cover living expenses.

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