

IS ALIEN PLANT INVASION A THREAT TO BURNING OF AUSTRALIAN FORESTS?

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Introduction:

Alien plant species (synonyms: adventive, exotic, foreign, introduced, non-indigenous, non-native, weeds) are plants whose presence in a region is attributable to human actions that enabled them to overcome fundamental biogeographical barriers (1).

To become an invasive species a plant must pass through at least three stages before they are considered to cause an ecological or economic impact (Fig. 1).

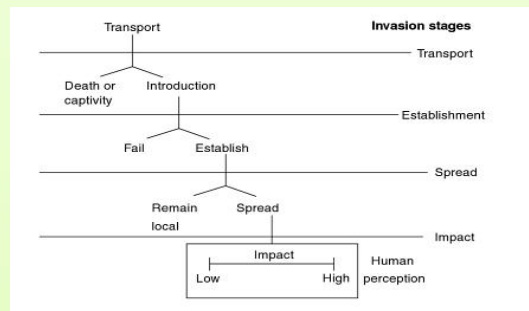


Figure 1. Invasion process model depicting the discrete stages an invasive species passes through as well as alternative outcomes each stages (2).

It is believed that since European settlement in Australia the rate of introduction and spreading of alien plants has increased linearly, however nowadays this rate seems to be increasing exponentially in some areas (3).

Differences in growth rate, plant architecture and ecophysiological characteristics among alien and native vegetation can alter fire regimes and produce significant changes in the balance of carbon, nutrient levels and water cycles (Fig. 2).



Figure 2. NSW areas invaded with *Lantana camara* (A,B,C) and Kudzu (*Pueraria lobata*) on trees in Atlanta, Georgia (D). (Pictures : (A,B) by Gary Warner, (C) by Valerie Densmore, (D) public domain) .

Objectives:

This PhD project aims to investigate the interaction of fire and invasive plant species in forests of eastern Australia by comparing biotic and abiotic features of pristine and invaded forests in burnt and unburnt conditions to provide a range of disturbance regimes.

Hypotheses:

- 1 – Woody weed invasion will change plant community composition and structure.
- 2 – Woody weed invasion alters the structure of fuel loads, particularly fine fuels, promoting changes in fire regime (e.g. frequency, intensity and spread).
- 3 – Weed invaded areas will promote different fire behaviour than non-invaded areas.

Methodology:

1. Data on vegetation structure will be collected both vertically and horizontally
2. Evaluation of floristic composition
3. Compare physiological features
4. Decomposition experiments
5. Biomass investigation
6. Flammability and foliar chemistry

Significance:

This knowledge is fundamental for management of forests in eastern Australia and to better understand the complexity of interactions, including the role of fire in ecosystems.

References:

- (1) Richardson DM, Pysek P, Carlton JT (2011) A compendium of essential concepts and terminology in invasion ecology. In 'Fifty Years of Invasion Biology: The Legacy of Charles Elton'. (Ed. DM Richardson) pp. 409-420. (Blackwell Publishing Ltd.)
- (2) Lockwood JL, Hoopes MF, Marchetti MP (2007) 'Invasion Ecology.' (Blackwell Publishing Ltd).
- (3) Cook GD, Dias L (2006) It was no accident: deliberate plant introductions by Australian government agencies during the 20th century. *Australian Journal of Botany* **54**, 601-625.