EFFECTS OF WOODY WEEDS ON FUELS IN FIRE-PRONE ECOSYSTEMS

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Introduction

Invasive species, such as African Olive (*Olea europea* ssp. *cuspidata*), are a common feature in most ecosystems in Australia, particularly in forests and woodlands close to urban settlements. A change in fire behaviour in infested areas can be expected due to differences in architecture, biomass and combustibility characteristics of the invasive species. Research relating to woody weeds and fire is relatively new and few studies have quantified change in fire behaviour in invaded areas. Of these limited studies, none contain information for developing predictions of fire behaviour that would be applicable to prescribed fire burning conditions.

Methods

Study areas at Mount Annan Botanical Garden


Woodland


Intermediate


Olive

Fuel hazard and percentage cover scores were assigned at regular intervals along a 50 m transect to indicate potential fire behaviour in each layer of the vegetation.


Mass Loss Calorimeter


Burning fuel

A series of tests were conducted using a Mass Loss Calorimeter to measure heat release during combustion of fuel from the three study areas. The fuel from two strata (low: 0-50 cm and high: 50-200 cm) were sorted into dead and live components.

Aim

To investigate how woody weed invasion alters fuel structure and fire behaviour in woodlands and forests

Results & Discussion

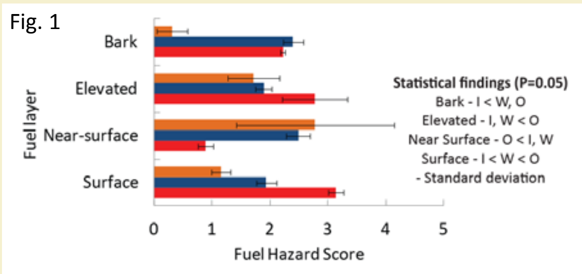
Fig. 1


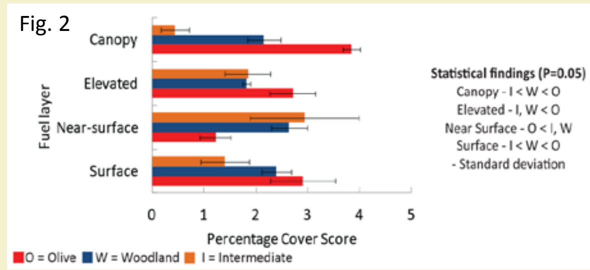
Fig. 2


Table 1. Fuel height distribution at Mount Annan Botanical Garden (mean ± SD)

	Woodland	Intermediate	Olive
Surface (mm)	13.6 ± 0.4 a	6.9 ± 1.0 b	22.9 ± 2.0 c
Near-surface (cm)	24.4 ± 5.4 b	36.4 ± 14.8 b	19.1 ± 5.0 a
Elevated (m)	1.9 ± 0.1 b	2.0 ± 0.2 b	2.8 ± 0.5 a

Areas invaded with African Olive have greater percentage cover scores for different fuel fractions (Fig. 1), higher fuel hazard scores (Fig. 2) and a deeper litter layer (Surface fuel height, Table 1) than native woodland and intermediate invaded areas. This suggests that areas invaded with African Olive may be more fire-prone. Differences in fuel structure and amount and resulting fuel hazard scores are likely to lead to considerable differences in fire behaviour in these three vegetation types. Each vegetation type therefore presents a different fire risk to the ecosystem and neighbouring human assets.

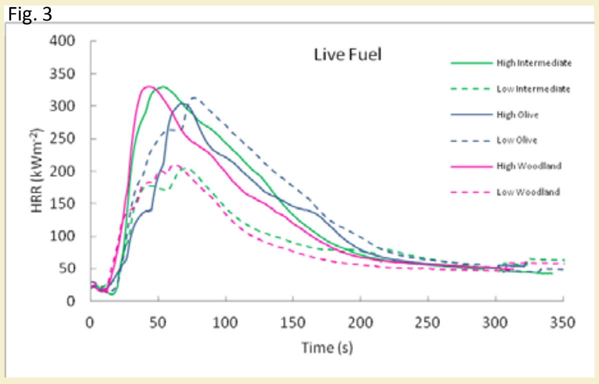
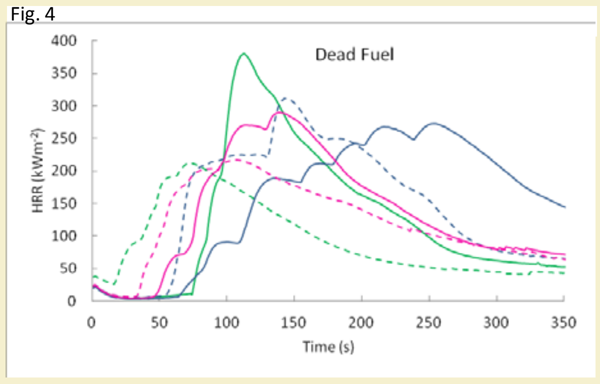
Fig. 3


Fig. 4


The combustion process, fire characteristics and fire propagation are closely related to the Heat Release Rate (HRR) of a fuel. The fire intensity, spread and hazard of wildfires can be predicted through models using this characteristic as one of its key points.

Each species has its own pattern of HRR and is dependant on morphological characteristics and environmental conditions. This preliminary study shows that dead fuel tends to burn hotter and longer then live fuel (Figs. 3 & 4). African Olive clearly displays a different pattern of HRR compared to other fuel types. This together with its unique architecture could lead to considerably different fire behaviour.