

Fire behaviour experiments in crop lands: understanding model limitations and improving fire management decision making

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Agricultural crops cover approximately 22 million hectares in Australia, representing about 2.9% of all land area. Cropland fires in Australia represent a significant threat to human lives and rural livelihoods. Nonetheless, our understanding of fire dynamics in croplands is limited. Little empirical research has been undertaken to understand fire behaviour in croplands with the general assumption that fires in such fuels behave similar to fires in open grasslands. Understanding the factors that influence the behaviour and spread of wildfires across the landscape is essential to properly identifying and quantifying the risks and threats posed by such events to society and the economy.

This presentation will focus on initial results from a multi-agency experimental field burn program aimed at understanding the influence of crop fuel characteristics on fire behaviour. The experimental design follows the research methodology used in previous grassland experimental burns to understand the effect of grass curing on fire behaviour, to allow for quantification of fire behaviour in different grassy fuel types. Experimental fires were conducted in wheat crop, under different harvest stages (e.g., unharvested, stubble and bailed). The research aims to quantify the variation in cropland fire behaviour compared to open grassland fires.



Image 1. Experimental plot layout consisting of 50 x 50m plots of wheat, under three treatment conditions (unharvested, stubble and bailed).



(a)



(b)

Image 2. Research burns reaching the end of the plots (a) Unharvested wheat; (b) harvested wheat.

The research outcomes will improve fire behaviour knowledge in croplands to draw comparison to fire behaviour in grasslands. The results will establish the need for refinement of the current grassland fire spread model or a new specific cropland fire spread model. The research will lead to improved fire behaviour predictions, early warnings and resource allocation.