TESTING MUTCH'S HYPOTHESIS IN SOUTHEAST QUEENSLAND: PLANT FLAMMABILITY REVISITED

Cuong Tran, Clyde Wild, and Tatia Zubrinich
Griffith University, Centre for Innovative Conservation Strategies, School of Environmental and Applied Sciences, Faculty of Environmental Sciences, PMB 50 Gold Coast Mail Centre, Queensland 9726, Australia

ABSTRACT

Mutch's Hypothesis states that some plants have evolved traits that enhance their own flammability in order to increase the probabilities of catastrophic wildfires, in order to eliminate competitors. In addition, these plants have also needed to evolve characteristics that would allow the plants to regenerate rapidly after these fires. Other studies have attempted to examine Mutch's Hypothesis, and recently some models have shown that flammability traits can be genetically inherited.

This study investigated the flammability characteristics of foliage and litter collected from subtropical rainforest (considered nonflammable) and sclerophyll forests (considered highly flammable) in southeast Queensland, Australia. Flammability was calculated using a specialized combustion chamber that accurately simulated conditions comparable to wildfires experienced in Australia. Flammability was assessed using predetermined characteristics such as flame residence time, consumption rate, rate of spread, and ignition potential. Heat release rate (or ''sustainability'') was shown to be an accurate indicator of flammability. Litter accumulation and decomposition rates in both vegetation communities were also assessed. Additional experiments involving the exchange of litter between forest types were also conducted to examine the effect of vegetation community on decomposition rates. Preliminary analysis of the results indicates a division in the flammability characteristics between flammable and nonflammable plant communities. This is also demonstrated in the litter experiments, in which the results indicate similar energy contents but differing rates of decay and accumulation. Mutch's Hypothesis may be able to explain the differences in flammability of vegetation communities that have the same climatic and meteorological conditions.

Citation: Tran, C., C. Wild, and T. Zubrinich. 2007. Testing Mutch's Hypothesis in southeast Queensland: plant flammability revisited [abstract]. Page 202 *in* R.E. Masters and K.E.M. Galley (eds.). Proceedings of the 23rd Tall Timbers Fire Ecology Conference: Fire in Grassland and Shrubland Ecosystems. Tall Timbers Research Station, Tallahassee, Florida, USA.