

Fire in Australia: how was the biota prepared for human occupation?

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In December 2015 the Ecological Society of Australia held their Annual meeting in Adelaide, and one of us (RSH) organised a symposium as part of that meeting titled ‘Fire in Australia: how was the biota prepared for human occupation?’ Most of the talks from this symposium are presented in this Special Issue of the *Australian Journal of Botany*. The talks covered a wide time span and many important issues. Most dealt directly with the interactions between plants and fire and how these interactions impacted in the very long-term on the response of individual species, and inevitably the makeup of the vegetation, and the potential impacts of early Aboriginal people on the Australian environment.

The papers highlight a set of interesting recent developments that open the opportunity for innovative research in the future. The topics covered are lively and indeed controversial in Australian plant science. Of particular note is how we use the fossil record. The growing global evidence for high charcoal levels in Cretaceous fossil deposits is at last beginning to be matched by records from Australia, due to some very specific searching for fossil-bearing sediments of the right age (Carpenter *et al.* 2016). If more of these important sediments can be found we

may learn a great deal about the early history of the characteristic Australian scleromorphic vegetation, as discussed by Hill and Jordan (2016). The remarkable discovery of very well preserved Eocene (53 Ma) eucalypt macrofossils in southern South America poses some very challenging questions about the origin of this taxon and the role of fire in its early evolution, as considered in detail in the context of fossil pollen (Macphail and Thornhill 2016) and macrofossils (Hill *et al.* 2016). For many years now the Latrobe Valley coal deposits have been the source of one of the most detailed reconstructions of the potential interactions of Australian plants species with fire, before the arrival of humans. It is now clear that the vegetation history in these coals was much more complex than has previously been reported (Sluiter *et al.* 2016); we have much still to learn about how fire impacted on the vegetation in these megaswamps. Aboriginal people arrived in Australia during the Pleistocene, and this Special Issue addresses the hot topics of the impacts of early humans on fire–vegetation interactions (Foreman 2016) and fire–vegetation–fauna interactions (Johnson 2016).

For the last few decades there has been a general view that we had a strong broad understanding of how the modern Australian



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vegetation evolved on an isolated continent. The major drivers of the species evolution that led to the modern vegetation were soil nutrients, water availability and temperature, with all three impacting on fire frequency and intensity. This broad view of the important factors in the evolution of the vegetation has not changed, but important evidence is accumulating to demonstrate that we are a long way from a clear understanding of the history of the vegetation of our continent. This Special Issue goes some way towards redefining some of the important and controversial questions that are still to be addressed.

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