

Not much, but enough: fire adaptation in *Leptospermum scoparium* (mānuka)

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Most of NZ's flora has minimal adaptation to fire and, of the indigenous woody plants, *Leptospermum scoparium* (mānuka) is one of the few that can flourish in the face of frequent fire. *L. scoparium* is closely related to strongly fire-adapted Australian species and is a relatively recent addition to the flora (c. 2-3 MYA). It has been favoured by the recent, unprecedented regime of frequent, human-lit fire. We evaluated three traits related to mānuka's fire ecology and pyrogeography: pyrescent serotiny, shoot-level flammability, the effects of heat shock on germination and the associations between them. While mānuka is one of NZ's most flammable indigenous species, flammability across the stands is highly variable and cannot be predicted from site-characteristics nor is it associated with serotiny. The germination response of seed capsules to heat shocking varied between sites, but heating was typically not detrimental to germination and was related to neither serotiny nor a site's long-term fire history. Serotiny varied within and between populations but was not predicted by a site's long-term fire history. It does, however, follow a strong north-south latitudinal gradient, being most prevalent in northern restiad wetlands which have a long history of recurrent fire, especially during the relatively dry, long glacial periods. We conclude that serotiny is a legacy of mānuka's Australian origin, and was maintained by infrequent fire during the Quaternary. While mānuka is not strongly fire-adapted, given the lack of such adaptations in the NZ flora it is sufficiently adapted to be advantaged by human-induced shifts in fire activity.