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TREE-CROWN STREETS AND WILDFIRES IN PINE PLANTATIONS OF AUSTRALASIA\*

M.E. Alexander<sup>2</sup>, N.P. Cheney<sup>3</sup> and A.C.F. Trevitt<sup>4</sup>

**ABSTRACT:** The term 'tree-crown street' has been coined to describe the pattern of burned or partially burned tree crowns, aligned roughly parallel to the general direction of fire spread, that is often left in the wake of crowning forest fires. Within the streets the foliage of the remaining trees varies from partially to completely scorched, whereas the vast majority of the burned area has experienced complete combustion of the available crown fuel.

Tree-crown streets are commonly seen following high-intensity crown fires in industrial pine plantations in Australasia, especially in instances where topography has not had a great influence on free-burning fire growth. The relatively uniform fuel distribution present in these man-made forests ensures that a clear signature is obtained of substantial variations in fire intensity. Post-burn vertical and oblique aerial photographs have been assembled for 12 exotic pine plantation crown fires in Australia and New Zealand that exhibited the tree-crown street phenomenon. Various patterns including long, straight strips and elliptical shaped bands have been noted. Continuous traces of surface wind velocity at nearby meteorological stations clearly show short-term variations in both wind speed and direction. These data support the hypothesis that wind fluctuations, through their effect on fire intensity, are largely responsible for the formation of tree-crown streets. This simple explanation is confirmed by the on-site observations of experienced fire managers and researchers and has important implications for fire-fighter safety and post-fire reconstruction of fire spread.

**KEYWORDS:** tree-crown streets; crown fire behavior; plantation fires; wind-driven fires.

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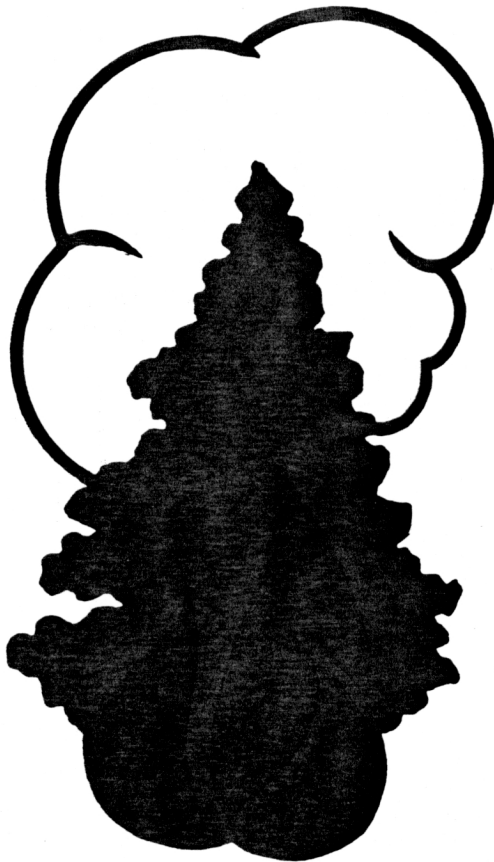
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