

## Weed recruitment following cyclonic disturbance of rainforest in Queensland's Wet Tropics

Daniel J. Metcalfe<sup>1</sup>, Matthew G. Bradford<sup>1</sup>, Andrew J. Ford<sup>1</sup>, Helen T. Murphy<sup>1,2</sup>, Gabrielle Vivian-Smith<sup>2,3</sup> and David A. Westcott<sup>1</sup>

<sup>1</sup> CSIRO Sustainable Ecosystems, PO Box 780, Atherton, Queensland 4883, Australia

<sup>2</sup> CRC for Australian Weed Management

<sup>3</sup> Biosecurity Queensland, Department of Primary Industries and Fisheries, Alan Fletcher Research Station, PO Box 36, Sherwood, Queensland 4075, Australia  
Email: dan.metcalfe@csiro.au

**Summary** Disturbance is an important factor in all communities, facilitating the successional process and contributing to the maintenance of ecosystem health and vitality. However, high frequency and/or intensity of disturbance can cause shifts in community structure and composition and, of particular concern, can provide sufficient disturbance for exotic weeds to establish in large numbers. Recent research in rainforest habitats has suggested that the long-held view that intact rainforest was virtually unassailable by weeds is wrong, and that catastrophic disturbance by cyclonic winds is a key factor in allowing aggressive disturbance adapted weeds to invade rainforest communities (e.g. Meyer 1997).

Cyclones are an important driver of the dynamics of the rainforests of the Wet Tropics Bioregion. Prevailing winds are from the south-east, but tropical cyclones irregularly cross the coast from a variety of directions, when high wind speeds, localised gusting, very high rainfall events and storm surges may affect the vegetation. Following Severe Tropical Cyclone 'Larry' in March 2006, which caused considerable and extensive damage to the rainforests of the Wet Tropics Bioregion, we surveyed what had been closed rainforest along and perpendicular to the cyclone track from landfall near Innisfail to where the cyclone left the Bioregion on its western edge. Exposure of the understorey to high light levels can lead to mass recruitment of light-demanding species, including weed species, of which there are a growing number with the potential to invade the Wet Tropics' rainforest. In order to assess the existing weed load in rainforest habitat within the Wet Tropics and the impact of severe tropical cyclone 'Larry' in promoting weed spread and establishment, we conducted 62 surveys of 0.1 ha in rainforest both along and perpendicular to the cyclone track. Weed diversity was relatively low at individual sites, and correlated most strongly with the degree of canopy openness. Distance from existing anthropogenic disturbances was not found significant in determining the weed community; however, weed seed dispersal type did play a role. There were approximately even

numbers of species which were vertebrate dispersed as were wind dispersed, but wind-dispersed species tended to be more frequently recorded at sites remote from pre-existing disturbances. Ongoing monitoring of weed recruits showed that herbaceous species rapidly seeded and died and slower growing weeds were frequently over-topped by native species.

Cyclones clearly have a significant impact on the vegetation of the Wet Tropics, particularly along eastern-facing foothills and coastal communities. Damage caused by cyclone 'Larry' was severe in places, and weeds were able to recruit into disturbed habitat. Natural regeneration processes by native species were also rapid and aggressive, and in most instances appear to soon lead to the replacement of weed infestations, though reproduction of many weeds is rapid and the exotic seed bank is likely to have been enlarged in the immediate post-cyclone period. Slower growing weeds which persist despite native regeneration were rare, but are more likely to have a significant effect on native community composition in the long term. Aggressive colonisers which are shade-tolerant as seedlings but respond rapidly to higher light levels post disturbance pose the greatest threat to native forest integrity, though some of these are also capable of recruitment under closed canopies.

**Keywords** Rainforest, natural disturbance, weed recruitment.

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