Africanising the tropical woodlands: canopy loss and tree death following gamba grass *Andropogon gayanus* invasion

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**Summary** African grasses, most introduced as pasture grasses, are over-represented in lists of alien invasive species and are recognised as an insidious and serious problem in Australia (Groves 2002). Of the 18 worst environmental weeds identified by Humphries et al. (1991), one-third were deliberately introduced pasture species. Gamba grass is one such African pasture species.

Concerns over the potential for gamba grass to alter fire regimes by increasing fuel load led Rossiter et al. (2003) to test whether a grass-fire cycle had been initiated in the savannas of northern Australia. A grass-fire cycle occurs when an alien grass increases the abundance of fine fuel, which increases fire frequency and in some instances intensity. This can cause a decline in tree and shrub cover, which may increase the chances of grass invasion and may further alter the fire regime and so the invasion proceeds in a self-perpetuating cycle (Rossiter et al. 2003).

To determine the extent to which the grass-fire cycle had altered vegetation structure in a tropical savanna, we used a combination of historic and current aerial photography together with field surveys of vegetation structure in an area with densely infested with gamba grass since 2000. We present our findings on tree canopy loss; quantified using digitised aerial photography (1992, 1998, 2003) and GIS-based analyses. Canopy cover was measured using a point-based sampling technique (*sensu* Bowman et al. 2001) using a sampling lattice comprised of 126 cells (50 × 50 m) with 100 sampling points (diameter 2 m) per cell.

Our results showed a 53% reduction in ‘canopy hits’ over the 12 year sampling period; we infer from this that there has been marked reduction in canopy cover. The evidence from this study, combined with that of previous studies (D’Antonio and Vitousek 1992, Rossiter et al. 2003) demonstrating changes on fire regime following gamba grass invasion, suggests that the fire-grass cycle documented in North, Central and South America is occurring in the tropical savannas of northern Australia. This study demonstrates the negative impact of the fire-grass cycle on a small scale. The current distribution of this alien invasive species, its continued spread and demonstrated ability to alter fire regimes, means that the local impact described may be occurring on a landscape scale.

**Keywords** *Andropogon gayanus*, invasive alien species, fire grass cycle, vegetation change, aerial photography, Poaceae.

**REFERENCES**


