

Leaf and coarse fuel accumulation and relationships with vegetation attributes in 'evergreen' tropical eucalypt savannas

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Summary

The distribution and proportional composition of leaf litter (<0.6 mm diameter) and coarse litter (woody debris, 0.6–5 cm diameter) play an important role in fire fuel dynamics in tropical savanna ecosystems. This chapter details geographic and seasonal variation in the rate and volume of leaf litter and coarse litter fuel accumulation in evergreen *Eucalyptus miniata* and *E. tetradonta*-dominated open forests and woodlands along a rainfall gradient (750–1600 mm) in the Northern Territory. The aim is to provide a basis for correlating remotely sensed measures of vegetation attributes (height, basal area, cover) with fine fuel accumulation, a key variable for emissions calculation.

Leaf litter accumulation rates were found to vary significantly with rainfall and tree basal area. The seasonality of leaf litter accumulation was found to vary most significantly with rainfall and latitude. Under higher rainfall (>1000 mm p.a.), mean leaf litter input was $5.01 \pm 0.48 \text{ Mg ha}^{-1} \text{ yr}^{-1}$, with 54% occurring in the late dry season (LDS) period after July. Under lower rainfall (<1000 mm p.a.), mean leaf litter input was $2.87 \pm 0.41 \text{ Mg ha}^{-1} \text{ yr}^{-1}$, with 74% occurring in the LDS period. Mean coarse litter inputs were $0.55 \text{ Mg ha}^{-1} \text{ yr}^{-1}$ and $0.22 \text{ Mg ha}^{-1} \text{ yr}^{-1}$, at higher and lower rainfall sites, respectively. Although seasonal differences were observed in coarse litter inputs, these were not associated with vegetation structural characteristics and it is suggested that, at plot scales, such inputs rather reflect disturbance events (e.g. high winds, severe fires).

Seasonal differences in leaf litter fuel loads are likely to contribute to significant differences in the total fine fuel loads between the early and late dry season, especially in the <1000 mm rainfall zone. Generally, these results reflect plant community compositional and hypothesised plant ecophysiological differences along the rainfall gradient. Rates of leaf litter accumulation in Top End savannas appear to be consistently greater than in other evergreen eucalypt formations outside the wet-dry tropics. Difficulties associated with the accurate quantification of coarse-woody debris accumulation at the plot scale are also highlighted, and recommendations for further studies to better quantify the range of variation in fine fuel accumulation rates within tropical savanna ecosystems are discussed.