

Comparative Study of Litter Quality, Decay Rates and Nutrient Fluxes of Invasive Species, *Austro eupatorium inulifolium* and *Cymbopogon nardus***Piyasinghe I.^{1*}, Gunatilake G.² and Madawala H.M.S.P.³**¹ Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka² Department of Geology, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka³ Department of Botany, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka

* ipkpiyasinghe@yahoo.com

Abstract

Invasion of alien species into new habitats poses serious threats to their vegetation and ecosystem processes. *Austro eupatorium inulifolium*, an invasive species, has been rapidly invading degraded grasslands dominated by *Cymbopogon nardus*, another invasive, in the Knuckles Conservation Area (KCA). Invasive plants with rapid growth rates and elevated leaf nutrient concentrations could alter decomposition process and nutrient release patterns. This study was aimed at studying the litter quality, decay rates and nutrient release patterns of *Austro eupatorium* and *Cymbopogon*. In situ litterbag experiment was conducted in less and highly invaded grasslands at KCA. Surface litter and standing litter (above-ground) also have been quantified to assess the contribution of C3 and C4 plants to soil nutrient pool.

Litterbags (n=40) were prepared with air-dried litter samples of *Austro eupatorium* and *Cymbopogon* and were distributed in highly-invaded (HIG) and less invaded (LIG) sites (by *Austro eupatorium*). Litterbags were collected at different time intervals and chemically analysed. The decomposition rate was calculated using loss of litter biomass. The surface litter was estimated using randomly placed quadrates (0.0625 cm²). Standing litter biomass was quantified by clipping quadrates (0.25 m²) to the ground level. Contributions to above-ground litterfall by C3 and C4 plants were assessed. The results were statistically analysed and compared using Minitab 14.0.

Higher mass loss was observed with *Austro eupatorium* litter than that of *Cymbopogon* in both less and highly invaded habitats. *Austro eupatorium* litter quality (in terms of N and P) is higher than that of *Cymbopogon*. Leaf litter of *Austro eupatorium* showed significantly lower C:N and C:P ratios compared to *Cymbopogon*. Nitrogen and phosphorus release patterns during decomposition found to be slow in both *Austro eupatorium* and *Cymbopogon* irrespective of their habitats. *Austro eupatorium* showed relatively higher decomposition rate throughout the study period compared to *Cymbopogon*. The surface litter and standing litter biomasses were significantly higher in HIG compared to LIG. In both habitats, C3 plants contributed more to the standing litter biomass than that of C4 plants. *Austro eupatorium* plants contributed more to the total C3 biomass in both LIG and HIG.

The present results suggest that due to higher quality and decomposition rates of *Austro eupatorium* litter, the invasion may leads to changes in the soil nutrient pools and also their cycling processes. Long-term soil studies need to be carried out in order to investigate these findings further.

Keywords: *Austro eupatorium*, Knuckles conservation area, Litter decomposition, C3 and C4 plants