

D-40: A comparison of growth, litterfall and its decomposition, soil characteristics and nutrient dynamics of a mixed and pure forest plantation in Sri Lanka

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Diverse views have been expressed on the benefits and drawbacks of monoculture plantations and mixtures with regard to sustainable production of timber. An experiment was conducted to compare the growth, litterfall and its decomposition and nutrient status of 16 year old *Eucalyptus grandis* monoculture, *Acacia mangium* monoculture and a mixture consisting of both species planted on the same site in Bandarawela in the intermediate wet zone of Sri Lanka.

Diameter at breast height (DBH) was measured in all the trees in 20 x 20 m plots in each plantation. Trees were then categorised into 5 diameter classes. Height was taken from a mean tree of each diameter class. 3 Littertraps of 1 x 1 m were

set up in each plantation to collect the litter. 18 litterbags were placed in each plantation with measured freshly fallen litter. 3 bags each were collected per month for a period of 6 months to assess rate of decomposition. 3 soil samples (pooled) were taken from each plantation to test for some physical and chemical parameters. In order to assess the nutrient flow, intact green and yellowed leaves, freshly fallen leaves, partly decomposed leaves, were also collected from the site of both *Eucalyptus* and *Acacia* plantations.

A significantly different ($p < 0.05$) variation was seen within the plantations in height and diameter (DBH). However, plantations did not vary significantly in these parameters between them. Total litterfall over a period of 6 months (Dec 1997 - May 1998) was 422 kg/ha in *Acacia mangium* (collected at the time of senescence) followed by 308 kg/ha in the mixture and 240 kg/ha in *Eucalyptus grandis*. The rate of decomposition was highest in the mixture followed by *Eucalyptus* and then *Acacia*. Soil moisture content, organic matter content and cation exchange capacity were highest in the mixture followed by *Eucalyptus* and then *Acacia*. The highest total N% was observed under the mixture followed by *Acacia* and then *Eucalyptus*. Highest available P was seen under *Acacia* followed by mixture and then *Eucalyptus*. However, highest exchangeable K was observed under *Eucalyptus* followed by *Acacia* and the mixture. In *Acacia mangium*, 92% of N, 99% of P and 89% of K was lost since the time of leaf shed and incorporation in the soil. The values for *Eucalyptus* were 92% of N, 66% of P and 98% of K. 34% in N, 73% in P and 82% in K were re-absorbed in the tree before leaf fall in *Acacia mangium* while it was 59% in N, 29% in P and 32% in K in *Eucalyptus grandis*.