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Field estimation of biological N₂-fixation by five tropical tree species using ¹⁵N isotope dilution methods

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One of the projects aims is the acceleration of the fallow period with planting of fast growing leguminous trees. Therefore, the screening and identifying suitable leguminous trees for enrichment planting was the most important objective of the present work. Previous studies have shown that improved fallow system with *Acacia mangium* planted at 1m x 1m produced about 45 t ha⁻¹ biomass within two years, which is about 10 times more than the lowest biomass production by *Clitoria racemosa* at 2 m x 2m (4 t ha⁻¹).

Two field experiments using the ¹⁵N isotope dilution methods were conducted to determine the contribution of five tropical tree legumes in term of biological nitrogen fixation (BNF). In February 1997 ¹⁵N-labelled ammonium sulfate applied to the smaller (768 m²) area of them at a rate of 9 kg N/ha. One month later plantations were established. Nursery-grown seedlings were planted at a spacing of 1m x 1m (density of 10000 plants per hectare). As enrichment, the following N₂-fixing tree species (NFTs) were planted: *A. mangium*, *A. angustissima*, *Inga edulis*, *C. racemosa* and *Sclerolobium paniculatum*. In addition to NFTs three non-fixing tree species (NNFTs), *Eucalyptus urophylla*, *Jacaranda copaia* and *Schyzolobium amazonicum* were used as reference plants for the isotope dilution calculations. Leaf samples were half yearly taken from NFTs and NNFTs and analyzed for their ¹⁵N/¹⁴N by ANCA mass spectrometry. On the basis of the obtained results, the percentage of N derived from N₂ fixation (%Ndfa) and total N accumulation of all five NFTs are presented.