Abstract

Gliricidia sepium is a fast growing legume shrub or tree with a wide range of environmental adaptation. Pruning of bushes at 1 m tall provides a source of crop nutrients. However, the value of pruning for increased agricultural productivity is not fully known. A study was carried out in a high rainfall humid tropical environment to investigate the contribution of *Gliricidia sepium* prunings (leaves and roots) and subsequent fallow with prunings to nitrogen (N) release pattern, sweet corn yield, nitrogen uptake and the N use efficiency (NUE) of the prunings. ^{15}N atom excess dilution and litter bag incubation techniques were used to partition N uptake and estimate N-release pattern of the leaves and roots. The prunings were applied as smooth stems and leaves at a rate of 120 kg N/ha in two split applications, 7–30 days after sweet corn germination. The crop was harvested after 75 days at the physiological maturity. The results showed that *Gliricidia Sepium* leaves and roots significantly ($p \leq 0.05$) increased sweet corn dry matter yield (3158 kg/ha) over the control (898 kg/ha). However, this was not significantly different from those treatments with leaf or root prunings in the presence of hedgerows. Use of root prunings as fallow showed significantly ($p \leq 0.05$) higher sweet corn dry matter (2175 kg/ha) yield than that (1082 kg/ha) obtained from leaf prunings application. Nitrogen partition using ^{15}N atom excess dilution showed that *Gliricidia sepium* fallow and leaf prunings contributed 25.9% and over 100% of total sweet corn N uptake and yield (as total dry matter), respectively. The incubation experiment showed that *Gliricidia sepium* leaves mineralize very fast, faster than roots, and should be re-applied within 20 days to maintain N-supply from the leaf prunings. It was concluded that *Gliricidia sepium* pruning and fallow contribute to the N uptake, growth and yield of the sweet corn with 5–9% NUE of the prunings. Further research is required to increase N use efficiency of *Gliricidia sepium* prunings and fallow in this study environment.