

The Role of Bracatinga (*Mimosa scabrella* Benth.) Traditional Agroforestry System in Biological Nitrogen Fixation

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Introduction

Bracatinga (*Mimosa scabrella* Benth.) is a leguminous tree native in southern Brazil where it is cultivated mainly as part of agroforestry systems. It covers about 60,000 hectares, scattered among 3,000 small farms in the Curitiba Metropolitan Region, state of Paraná. The species provides wood for building and fuelwood for industries and household uses. Due to its value as a multiple purpose tree and its contribution to a large market, bracatinga plays an important role in the regional socio-economy. Ecologically, it affects soil conservation, environmental contamination and stimulation of species diversity in its stands (EMBRAPA, 1988). This abstract presents some summarised original results about biomass production and quality in that system with emphasis on nitrogen cycling.

Material and methods

In five stands, 200 trees were measured in order to elaborate predictive biomass equations and to carry out laboratory analysis for nutrient contents. The trials included 25 inventory plots and 20 plots for litter residues and nutrient analysis. The complete methodology was described by Baggio (1994).

Results and Conclusions

Biomass accumulated in bracatinga stands until rotation age (7 years) was distributed as follows (average of dry matter): fuelwood = 60,000 kg/ha (85.4%); Branches = 6,400 kg/ha (9.24%); foliage = 3,500 kg/ha (9.41%); Nitrogen contents in these parts amounted to 313.7 kg/ha (0.523%), 65.6 kg/ha (0.523%) and 104.1 kg/ha (2.949%), respectively.

Residues at final rotation (accumulated litter and exploitation) reached 9,800 kg/ha (D.M.) of firewood (24%), 15,100 kg/ha (D.M.) of branches (37%) and 15,900 kg/ha (D.M.) of litter (39%). Nitrogen in total biomass was estimated at 493 kg/ha, (including undergrowth species).

All residues are burned in the field in order to clear the land for crops and the regeneration of forest tree species. This practice contributes to the exhaustion of soil nutrients through atmospheric emissions and water runoff. Nitrogen loss was estimated to 355 kg/ha which is equivalent to 2.300 Tm/year for the whole Curitiba Metropolitan Region (6.500 Ha/year). Exportation and cycling of macro and micro nutrients are discussed by Baggio (1994),

Alternative practices are being studied in order to minimise the effect of controlled fire and to improve forest land use. Bracatinga green biomass can be used as fodder or material for mulching or composting. Understorey species are usually ignored for any use but some of them are useful for garden stakes, tool handle or medicinal uses.

References

EMBRAPA/CNPF (1988). Documento, nº 20. 70 p.

Baggio, A. J. (1994) Doctoral Thesis. Univ. Pol. Madrid. 255 p.