Forage yield and soil moisture content in *Panicum maximum* cv. Tanzania monoculture and in a mixture with *Leucaena leucocephala* with different densities in Mexico

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Introduction Cattle production is limited by forage availability during the dry season since water and soil fertility are the main factors limiting production. Leucaena leucocephala has good nutritive value (24-30% CP). It can stand drought and grazing and so its introduction into pastures is recommended as an alternative to forage production during the dry season. The aim of this study was to assess the effect of the introduction of L. leucocephala with different densities on biomass production of P. maximum and soil water content.

Materials and methods The experiment was in Yucatan, Mexico, with mean annual rainfall below 1200 mm with Luvisole and Leptosole soils fertilised with 50N 80P 30K. Treatments were a mixture combining Panicum maximum cv. Tanzania and L. leucocephala, with two densities (5,000 and 10,000 pl/ha) and monoculture of P. maximum. The experiment was carried out between Nov. 2001 and Nov. 2002. A randomised block design with four replicate plots of each treatment was used. Dry matter yield (DM) was calculated including tree and pasture biomass on a surface basis (Hodgson et al., 1981). Yield was estimated every 42 d during rains and every 62 d during the drought. Soil gravimetric moisture content (SWC) (Aguilera & Martínez, 1996) was estimated weekly at 30, 60 and 90 cm depth in Luvisoles soil and 20 and 40 cm depth in Leptosoles soil.

Results Dry matter yield differed between treatments harvested during the dry and rainy seasons ($P<0.05$). The monoculture of *P.maximum* cv. Tanzania had a yield of 22.5 t/ha per year compared with the yield of grass in the mixture of 21.3 and 19.3 t/ha per year plus yields of *L. leucocephala,* at 2.4 and 4.9 t/ha per year at 5,000 and 10,000 pl/ha, respectively) (Figure 1). In both Luvisoles and Leptosoles SWC diminished ($P<0.01$) as soil depth increased. Water was limited in Leptosoles due to soil depth (0-40 cm) and competition between trees and grass for water and nutrients. This resulted in a low SWC ($P<0.05$) of 23.9% and 24.4% in the *P. maximum-L. leucocephala* mixture with densities of 5,000 and 10,000 pl/ha, respectively, and 26.7% in the *P. maximum* monocultures. This may explain why yields in mixtures are lower than in monocultures (Lehmann *et al*., 1998). In Luvisoles, SWC was similar in monoculture and mixture.

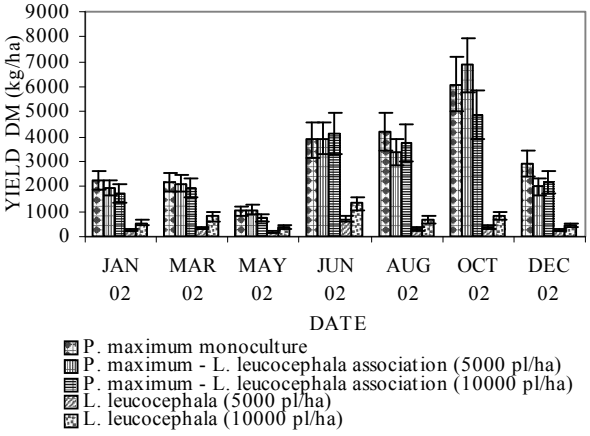

Figure 1 *P. maximum* DM yield of mixture and monoculture

Conclusions Introduction of *L. leucocephala* with density of 10,000 pl/ha reduced DM yield, while 5,000 pl/ha had no effect on DM yield. The SWC was higher in monocultures. It is important to assess ecological interactions of pastures mixed with woody perennials in developing silvopastoral systems.

References

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