
Alley Cropping: a System to Sustain Soil Productivity

Dennis Shannon, Associate Professor in the Department of Agronomy and Soils at Auburn University, sent us information about alley cropping, including results from experiments done by him and his colleagues. The full write-up (called "Alley Cropping: A System to Sustain Soil Productivity") is available from our web site (www.ECHOcommunity.org (<http://www.echocommunity.org/>)).

When selecting a hedgerow species for alley cropping, keep in mind that leaves should readily decompose when applied to the soil. Shannon wrote, "Some species, such as *Flemingia macrophylla*, have a chemical composition that causes them to decompose slowly. These species would be more appropriate for situations where the aim was to provide a mulch cover and increase the soil organic matter reservoir in the soil. In a study conducted in Haiti, gliricidia (*Gliricidia sepium*) had the fastest decomposition rate of five hedgerow species tested, though leucaena (*Leucaena leucocephala*) and gliricidia were tied for total amount of nitrogen released in a period of eight weeks, because leucaena had a much higher yield of leaves and small stems."

Shannon commented that results with leucaena might be inferior outside of its native range of Central America and the Caribbean. That is because of the psyllid, an insect that severely damages leucaena in parts of Asia and East Africa. In its native range the psyllid does not seem to pose a problem except at higher elevations. Regarding tests conducted in Haiti, Shannon wrote, "*Acacia angustissima* was the most productive hedgerow species tested and released the most biomass at 900 to 1200 m elevation. *Calliandra calothyrsus* also appears promising under high rainfall, but was not as productive in our trials as *A. angustissima*."

Shannon also commented on the importance of applying prunings to the soil, and of timing the pruning operation. He and colleagues grew hedgerows among maize (grown without fertilizer) over a period of seven years in a location in Haiti with a slope of 23% and with a shallow soil that had high pH and high organic matter content. For a control, they used a rock wall (instead of tree hedgerows) on plots that had 25% more plants (because with hedgerows, the alley cropping takes up space). The hedgerows were pruned as follows: 1) at planting and 30 days after planting, 2) at planting and 40 days after planting, or 3) at planting, 30 days after planting, and 60 days after planting. Shannon summarized the results as follows: "Averaged over the 12 seasons when a crop was harvested, the best pruning regime yielded only 7% more maize than the rock wall control. However, for the rock wall treatment, the high yields were in the first seasons, while with alley cropping, the yields were relatively stable across the period of the trial. In the best

seasons, the alley cropping treatments yielded 30% higher than the rock wall treatment, despite having 20% fewer maize plants." Tree hedgerows also seemed effective at reducing soil loss, and can provide wood for fuel and staking.

[Ed (MLP): I attended a conference at the World Agroforestry Centre in Kenya this past November. Dr. Pedro Sanchez, its Director General until recently, commented that, to their surprise, after extensive research on alley cropping, they have concluded that in most cases it does not appear to be that promising. I believe that where rainfall is limiting, competition with water is one reason for this.]