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Groundnut / Cassava / Maize Intercrop Yields Over Three Cycles of a Fallow / Crop Rotation with Planted *Senna spectabilis*, *Flemingia macrophylla* and *Dactyladenia barteri* on Ultisol

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Abstract

Three complete cycles of two years fallow followed by slash-and-burn land preparation and one year of groundnut/cassava/maize intercropping were conducted with *Senna spectabilis*, *Flemingia macrophylla* and *Dactyladenia barteri* planted hedgerow fallows versus no-tree control on an Ultisol in southern Cameroon to determine if yields of this most common subsistence field type can be increased.

Groundnut grain yields were unaffected by fallow system in 1998 and 2001 and the sum of the three cropping years. Maize grain yield was unaffected by fallow system in 1998. In 2001 and 2004 maize grain yield was highest in the *S. spectabilis* system. Total maize grain yield across the three cropping years was higher in the *F. macrophylla* and *S. spectabilis* systems than in the *D. barteri* system. Cassava root yields were in all years and the sum of the three years unaffected by fallow system. Cassava root (1998, 2001) and groundnut grain (2001) yields had significant spatial responses to the distance from hedgerows, with yield increases with increasing distance from hedgerows. Annual biomass production of hedgerow prunings during cropping phases ranged from zero (*D. barteri*) to 3.4 Mg ha^{-1} (*S. spectabilis*). During the growth of groundnut and maize, hedgerows produced $<$ 1Mg ha^{-1} in 1998, $<$ 0.6 Mg ha^{-1} in 2001 and $<$ 0.8 Mg ha^{-1} at any individual pruning. Combined relative crop yields over the three cycles were lower in planted fallow than in no-tree control. The N export with groundnut and maize grain and cassava roots, as an indicator of crude protein production was lower in the planted hedgerow fallow systems than in no-tree control. The planted fallow hedgerow system appears unsuitable to improve crop yields because the nutrient supply from prunings is low due to their low biomass production. Yet on short distances, the spatial response of cassava and groundnut indicates competition between hedgerows and crops, which was most pronounced on cassava and groundnut in the *S. spectabilis* system. The crop combination appears incompatible with planted hedgerow trees as benefits realised by the maize were outweighed by losses in groundnut.

Keywords: Cameroon, cassava, *Dactyladenia barteri*, *Flemingia macrophylla*, groundnut, maize, *Senna spectibilis*, subsistence agriculture, Ultisol

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