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Full Length Research Paper

Effect of proportion of component species on the productivity of *Solanum aethiopicum* and *Amaranthus lividus* under intercropping

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Abstract

In central Uganda, 'garden egg' (*Solanum aethiopicum*) is commonly intercropped with 'spleen amaranth' (*Amaranthus lividus*) but the productivity of this mixture is unknown. The objective of the experiment was to determine the yield advantage from this mixture. Treatments tested included pure stands of *Solanum aethiopicum* and *Amaranthus lividus*, locally called nakati and ebugga, respectively, 'additive mixtures', and several 'replacement series' mixtures. Generally, pure stands gave the highest total and edible DM yields. For each species, DM yield in mixtures was significantly higher ($P < 0.05$) in mixtures in which it constituted the highest proportion, that is 75:25% *Solanum*:*Amaranthus* replacement series mixture in the case of *S. aethiopicum*, and 25:75% mixture in the case of *A. lividus*. Intercropping reduced total *S. aethiopicum* DM yield by 72% in the 25:75% *Solanum*:*Amaranthus* mixture, while *A. lividus* yield was reduced by 68% in the 75:25% mixture. There was high correlation between *S. aethiopicum* and *A. lividus* plant population and edible DM yield ($r = 0.71$ and 0.98 , respectively). The difference in yield between pure stand *S. aethiopicum* and the 75:25% *Solanum*:*Amaranthus* mixture was not significant yet it was associated with 93 kg ha^{-1} of edible DM yield of *A. lividus* as a 'bonus' yield, equivalent to 27% of the edible DM yield of pure stand *A. lividus*. Generally, the additive mixtures gave higher *S. aethiopicum* DM yield than the replacement series mixtures with less than 50% *S. aethiopicum*. The 37% lower edible DM yield of *S. aethiopicum* in the double compared to the single additive mixture was attributed to greater competition against *S. aethiopicum* by the double *Amaranthus* rows compared to the single *Amaranthus* rows but the double additive

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mixture had about 55% more edible *Amaranthus* DM yield than the single additive. Most mixtures gave yield advantages, with the double (47%) and single (39%) additive mixtures giving higher yield advantages than the replacement series mixtures. On the basis of gross returns, most mixtures were more profitable than the pure stands.

Key words: Garden egg (*Solanum aethiopicum*), spleen amaranth (*Amaranthus lividus*), proportion of component species, plant population, intercropping, yield advantage.

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