

Can Intercropping Maize with Mung Bean Provide Sufficient Nitrogen to Maize When Inorganic Nitrogen Supply is Reduced by 50%?

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An adequate Nitrogen (N) supply is a requirement for maize to achieve its yield potential. Recent shortages of inorganic nitrogen fertilizer in Sri Lanka have prompted search for alternative means of nitrogen supply to maize crops. Intercropping with a legume is one such pathway, as the nitrogen fixed via biological fixation could be made available to maize. Study was conducted to determine whether intercropping maize with mung bean could compensate for a reduced supply of inorganic nitrogen. The field experiment was done at the Dodangolla Experimental Station during *Maha* 2022-23 in a randomized complete block design in three blocks. Maize was cultivated as the main crop in sole and mixed stands with mung bean, at 100% and 50% of recommended external nitrogen levels. At 50% flowering of maize (two months after planting) soil available nitrogen (NO_3^- fraction) and leaf nitrogen concentrations were significantly ($p < 0.05$) greater in intercropped plots at 50% nitrogen levels, compared to sole maize with 50%N. Total nitrogen uptake of intercrops at both N levels was not significantly different from their respective sole crops at 50% flowering of both crops and it was significantly lower at 50%N in both stands. Intercrop maize yield was not significantly ($p > 0.05$) different from its respective sole crop yield at both N levels. Reduction of N supply reduced maize yield in both crop stands. Similar patterns were observed for total plant biomass of maize at one and two months after planting. The intercrops had land equivalent ratios of 1.19 (100%N) and 1.21 (50%N) which demonstrated an increased land productivity at both N levels. This additive population mixtures of intercropping increases land productivity, even at sub-optimal external nitrogen supply. Continuous intercropping of maize with mung bean over several seasons may ultimately compensate for the yield loss due to reduced nitrogen supply.

Keywords: Legume-maize intercropping, Nitrogen availability, Nitrogen fixation, Nitrogen in plants, Nitrogen quantification

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