

Effect of mono-cropping and inter-cropping of Cowpea (*Vigna unguiculata*), Bush Bean (*Phaseolus vulgaris*) and Tomato (*Lycopersicon esculentum*) on crop growth and yield and soil microbial activity

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Abstract

A pot experiment was conducted under green-house condition to evaluate the growth and yield of tomato, cowpea, and bush bean under mono-cropping and intercropping and soil microbial activity.

Six different crop combinations; Tomato (T1), Cowpea (T2), Bush bean (T3), Cowpea + Tomato (T4), Bush bean + Tomato (T5), Cowpea + Bush bean (T6) were tested @ two plants/pot (30cm diameter). Complete Randomized Design (CRD) with three replicates was used. Statistical analysis was carried out using the Student Newman-Kuells Means Separation Test of SAS program (9.1.3). Number of flowers, number of fruits/pods, fruit/seed weight, number of leaves, number of root nodules per plant and plant height were measured. Soil microbial activity was measured according to the CO₂ evolution method.

Tomato grew better when intercropped with cowpea or bush bean (legumes) than a mono-crop. Significantly higher yield were recorded from tomato when grown with bush bean (45%) and cowpea (15%) as compared to mono-cropped plants. Significantly higher yield (106%) was recorded in cowpea when growing with tomato as comparing to mono-cropped cowpea. Bush bean, produced 35% more yield when intercropped with tomato as compared to mono cropped bush bean.

When legumes grow as mono-crop or inter-crop with another legume did not significantly increase the yield. Intercropping legumes (bean or cowpea) with tomato is more beneficial for legume as well as tomato. Significantly higher microbial activity (840 CO₂ mg/kg of soil) was observed in tomato grown as mono-crop however the highest microbial activity does not mean the highest yield.

Keywords: *Intercrop, Mono-crop, Cowpea, Tomato, BushBean*

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