

RESEARCH NOTE

The effect of poultry manure and inorganic fertilizer on the arbuscular mycorrhiza in coconut

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The arbuscular mycorrhizal fungi (AMF) are known as beneficial soil micro-organisms and they have been widely used as bio-fertilizers to improve seedling vigor in plant nurseries^{1,2} as well as in fields to restore the soil fertility and thereby to improve crop growth^{3,4}. Coconut (*Cocos nucifera* L.) is an important food and cash crop in most tropical regions of the world. Unfortunately, the coconut industry has recently faced a major problem in yield reduction. It was speculated that the underlying causes for this may be the depletion of soil physico-chemical and biological properties of the plantations⁵. The current study was conducted as a preliminary

investigation to estimate and compare natural AMF colonization and soil spore densities in coconut palms located in the low country intermediate zone.

The study was conducted at the Rathmalagara experimental plantation of the Coconut Research Institute (CRI) in a randomized complete block design where three

blocks were treated annually viz., no fertilizer application (NT); inorganic fertilizer mixture comprising 800 g of urea, 1600 g of muriate of potash, 900 g of Eppawala rock phosphate and 1 kg of dolomite per palm per year, the recommended inorganic fertilizer mixture (IFM) for adult coconut palms; and poultry manure (30 kg) with a supplement of muriate of potash (0.25 kg) per palm (PL). One year after fertilization, soil (12 cm depth) and actively growing root samples were taken in triplicate from the rhizosphere of selected palms in each treatment in each block. Actively growing roots were cleaned and stained with 0.1% Trypan blue, then percentage of root

colonization, arbuscules and number of vesicles were determined³. The spores were separated from soil samples according to the wet sieving method and counted³. Soil samples were analyzed for selected physicochemical properties namely, pH, electrical conductivity (EC), organic carbon (OC), NH₄⁺-N, NO₃⁻-N and available phosphorus (P_a) using standard methods⁶.

Table 1: Means with standard errors of root colonization, arbuscules, number of vesicles of arbuscular mycorrhiza, coconut yield in non treated (NT), inorganic fertilizer mixture (IFM) applied and poultry manure (PL) applied coconut palms.

Treatment	Percentage of root colonization	Percentage of arbuscules	Number of vesicles/ 1 cm root length	Total number of spores / 1g Soil	Coconut yield nuts/palm/ month
NT	46.9 ^a ± 1.4	28.5 ^a ± 1.2	1.4 ^b ± 0.1	204.1 ^b ± 12.8	6.4 ^a ± 0.58
IFM	29.0 ^b ± 3.2	9.5 ^b ± 1.3	2.5 ^a ± 0.4	261.2 ^a ± 29.5	8.0 ^b ± 0.37
PL	42.0 ^a ± 1.2	13.1 ^b ± 0.5	0.9 ^b ± 0.1	151.6 ^b ± 23.1	11.6 ^c ± 0.29
Significance	***	***	***	*	***
LSD (α = 0.05)	7.49	3.69	0.79	79.14	0.75

Means with different letters within columns are significantly different, * at p ≤ 0.05, *** at p ≤ 0.001; LSD: least significant difference.

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