

Studies on integrated nutrient management (INM) in elephant foot yam

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ABSTRACT

The maximum yield of corm in elephant foot yam can be obtained by the application of 75% RDF (through inorganic source) + 25% RDF (through organic source) + 5 kg AMF/ ha + 5 kg *Azospirillum* /ha. INM is better option than pure application of chemical fertilizer, which, if continuously used, may degrade soil fertility and in long run effort for sustainable agriculture may go in vain.

Key words : Elephant foot yam (EFY), Organic fertilizers, Inorganic fertilizers, Bio-fertilizers, Growth and yield

Until 1980s, it was widely perceived that inorganic fertilizers were a viable means of increasing land productivity in the low fertility soils of the humid tropics. Organic fertilizers (e.g. compost or farmyard manure) were regarded as important, but it was obvious that they were not available in sufficient quantity to drastically increase food production. In the early 1980s, various reports showed that the use of inorganic fertilizers in the tropics had stagnated, and this was explained by poor marketing and inadequate profitability. From that time on, integrated nutrient management has been advocated. Essentially, this involves the combination of both inorganic and organic fertilizers to increase crop production (Janssen, 1993).

Keeping pace with population growth and increasing land scarcity will be more difficult than in the overall strategy for increasing crop yields and sustaining them at a high level must include an integrated approach to the management of soil nutrients, along with other complementary measures.

An integrated approach recognizes that soils are the storehouse of most of the plant nutrients essential for plant growth and that the way in which nutrients are managed will have a major impact on plant growth, soil fertility and agricultural sustainability. Farmers, researchers, institutions, and government all have an important role to play in sustaining agricultural productivity.

In present study the effect of integrated nutrient management on growth and yield characters of elephant foot yam has been observed at Navsari Agricultural University, Navsari.

MATERIALS AND METHODS

A field trial on *Amorphophallus* (cv. GAJENDRA) was conducted in Randomized Block Design at Regional Horticultural Research Station, ASPEE College of Horticulture and Forestry, of Navsari Agricultural University, Navsari. Planting of 500g corm was done in the month of May 2007 at spacing of 60 cm x 60 cm with three replicates. Nine treatments were taken for this study. Details of treatment are given in Table 1.

RESULTS AND DISCUSSION

Table 2 shows the effect of different INM practices on growth and yield of elephant foot yam.

In present study, all growth parameters were found to be non-significant while, the yield of corm found significant. The maximum yield of corm was recorded in treatment T₄ {75% RDF (through inorganic source) + 25% RDF (through organic source) + 5 kg AMF/ha+ 5 kg *Azospirillum*/ha}. Whereas the minimum corm yield was noted in T₁ (50% RDF (through inorganic source) + 25% RDF (through organic source) + 5 kg PSB/ ha + 5 kg *Azospirillum* /ha). Mahendran and Kumar (1998) reported that the application of the recommended NPK rate + soil inoculation with *Azospirillum* and phosphobacteria give the highest tuber yield for potato.

Similar result was obtained by Henpithaksa (1993) when *A. oncophyllus* (*A. campanulatus*) was grown on soil amended with 2 t rice hulls, black rice hulls, maize cobs, cattle manure, coir peat or castor meal. Tuber weight/plant and total yield were increased by all organic amendments. Rajamani *et al.* (2001) observed highest tuber yield in cassava when recommended dose of

Table 1 : Treatments applied for INM study in elephant foot yam

T ₁	50% RDF (through inorganic source) + 25% RDF (through organic source) + 5 kg PSB/ ha + 5 kg <i>Azospirillum</i> /ha
T ₂	50% RDF (through inorganic source) + 25% RDF (through organic source) + 5 kg AMF/ ha + 5 kg <i>Azospirillum</i> /ha
T ₃	75% RDF (through inorganic source) + 25% RDF (through organic source) + 5 kg PSB/ ha + 5 kg <i>Azospirillum</i> /ha
T ₄	75% RDF (through inorganic source) + 25% RDF (through organic source) + 5 kg AMF/ ha + 5 kg <i>Azospirillum</i> /ha
T ₅	75% RDF (through inorganic source) + 25% RDF (through organic source) + 5 kg <i>P. fluorescens</i> / ha + 5 kg <i>T. viridae</i> /ha
T ₆	50% RDF (through inorganic source) + 25% RDF (through organic source)
T ₇	75% RDF (through inorganic source) + 25% RDF (through organic source)
T ₈	75% RDF (through inorganic source)
T ₉	100% RDF (through inorganic source)

Table 2 : Effect of INM on growth and yield of elephant foot yam cv. Gajendra under South Gujarat conditions

Treatments	Plant height (cm)	Girth (cm)	Canopy spread (cm)	Corm yield kgplot ⁻¹	Corm yield t ha ⁻¹
T ₁	63.22	3.57	67.94	61.56	47.50
T ₂	61.20	3.51	67.16	73.32	56.57
T ₃	56.67	3.20	61.42	79.80	61.57
T ₄	72.29	3.78	73.40	81.00	62.50
T ₅	62.76	3.66	65.29	77.40	59.72
T ₆	65.74	3.72	70.37	66.60	51.38
T ₇	62.82	3.62	66.25	72.60	56.01
T ₈	59.17	3.41	69.50	64.20	49.53
T ₉	51.67	2.95	50.33	78.60	60.64
S.E. ±	6.78	0.31	8.06	4.38	3.38
C.D. (P=0.05)	NS	NS	NS	13.08	10.09
C.V. %	19.04	15.48	21.23	10.43	10.43

NS = Non significant

fertilizer with N and K applied in 3 split doses along with *Azospirillum* and phosphobacteria. In case of cassava combination of FYM + 100 kg N + 75 kg P + 100 kg K/ha + *Azospirillum* + foliar application of 0.5 % ZnSO₄ and 1.0% FeSO₄ at 60, 75 and 90 days after sowing gave the highest tuber yield (Sucheta *et al.*, 1991).

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