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Research Paper

Integrated nutrient management for greater yam (*Dioscorea alata* L.) cv. LOCAL

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ABSTRACT

In order to explore the possibility of improving growth and productivity of greater yam (*Dioscorea alata* L.) cv. LOCAL by involving integrated nutrient management, an experiment was formulated and conducted during *Kharif* season of 2008-09 and 2009-10 at Rambhas Farm, Krishi Vigyan Kendra of Navsari Agricultural University, Gujarat, India. Eight treatment combinations were evaluated on greater yam variety "Local", in Randomized Block Design (RBD) with three replications. Application of 75 % RDF (Through IOS) + 25% RDN (Through OS:FYM) + *Azotobacter* 5 kg ha^{-1} + PSB 5 kg ha^{-1} (T_8) was proved to be beneficial in connection with maximum tuber yield (31.44 t ha^{-1}) which was at par with the treatment of T_4, T_5 and T_7.

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Key words : Greater yam, Organic fertilizers, Inorganic fertilizers, Bio-fertilizers, Growth and yield

INTRODUCTION

Plants belong to genus *Dioscorea* of the family Dioscoreaceae under monocotyledons are commonly known as yams. Of the 6 important edible species of yams, greater yam (*Dioscorea alata* L.) popularly known as *Ratalu*, is the most important edible yam of many parts of the world. In India it is extensively cultivated in Madhya Pradesh, North-eastern States, West Bengal, Bihar, Orissa, Uttar Pradesh, Kerala, Tamil Nadu, Gujarat and Maharashtra as a commercial crops. Besides, it is also ideal for fries, chips and flakes. It contains 18-20 % starch with mucilaginous substance and is extracted in a commercial basis. It also contains quite good amount of alkaloids, tannins and steroids having pharmaceutical value and used in Ayurvedic, Unani and Homeopathy medicinal preparations. It is a sun loving plant and commercially propagated vegetatively by tuber. The tuber shape is extremely variable.

Several factors are found to affect the yield and quality of greater yam. Long term fertilizer experiments (LTFE's) had reported that continuous and intensive use of chemical fertilizers have resulted in numerous problems like micro- nutrient deficiencies, nutrient imbalances in soil as well as plant system, pest infestation, deterioration of soil health, environmental pollution and stagnation in the crop productivity. To meet out nutrient requirements, environment safety and to maintain soil health, INM system has great promises (Virmani, 1994).

The integrated nutrient supply includes the use of chemical fertilizers with organic sources like F.Y.M., crop residues etc. along with bio-fertilizers helps not only in bridging the exiting wide gap between the nutrient removal and addition but also in ensuring balanced nutrient proportion, in enhancing nutrient response efficiency, add in maximizing crop productivity of desired quality (Singh and Kalloo, 2000).

Information on the conjoint use of organic sources and chemical fertilizers in this crop under the South Gujarat conditions is very limited. Considering its greater importance and cultivation in the country, future scope and a heavy demand by all class of consumers as well as to curb the trend of declining yield there is a great need to adopt the most appropriate approach of Integrated nutrient management system and thereby increasing the yield of the crop under the question. The recommended nutrient requirement of greater yam is 80-60-80 NPK kg/ha (Laxminarayan, 2008).

Keeping facts in view as high lighted above, the present investigation involving Integrated nutrient management components was taken of with tropical tuber crop *i.e. Dioscorea alata* L. cv. LOCAL.

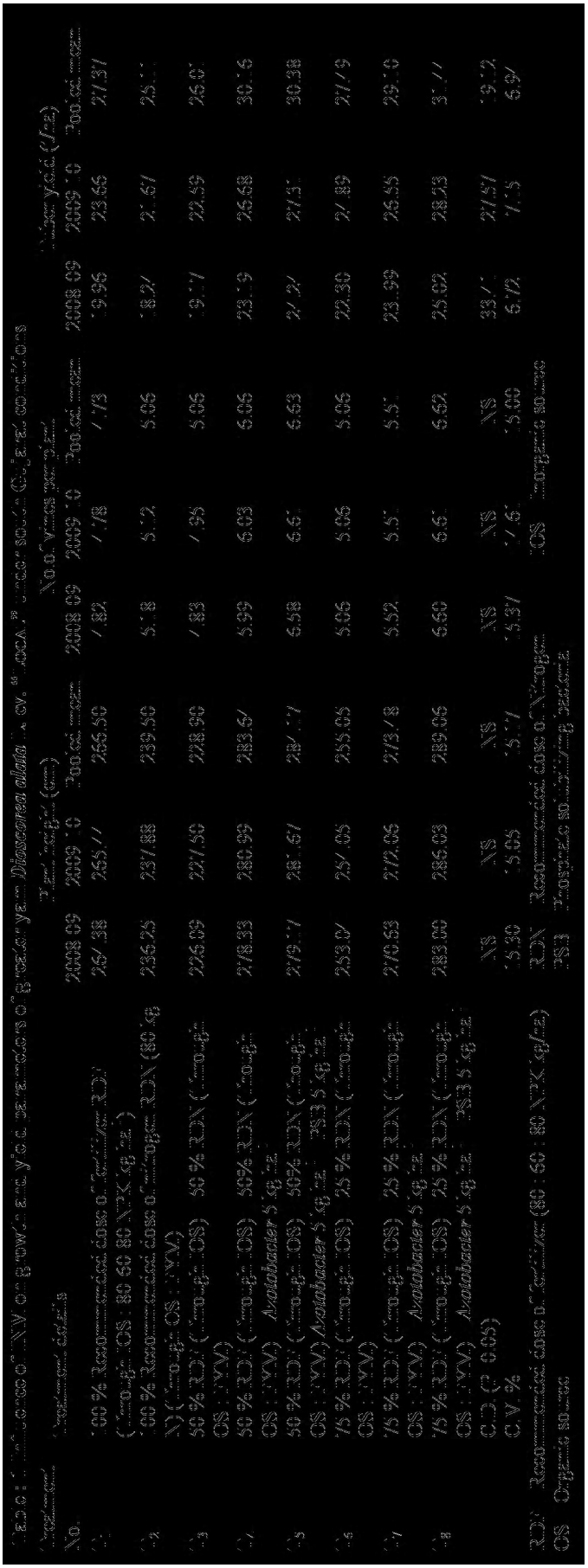
MATERIALS AND METHODS

The filed experiment was conducted during the *Kharif* season of 2008-09 and 2009-10 at Rambhas Farm, Krishi Vigyan Kendra of Navsari Agricultural University, Gajarat, India. The experiment was laid out in Randomized Block Design with three replications. Total eight treatment combinations namely, T_1 : 100 % Recommended dose of fertilizer RDF (Through IOS : 80-60-80 NPK kg ha^{-1}), T_2 : 100 % Recommended dose of nitrogen RDN (80 kg N) (Through OS : FYM), T_3 : 50 % RDF (Through IOS) + 50 % RDN (Through OS : FYM), T_4 : 50 % RDF (Through IOS) + 50% RDN (Though OS : FYM) + *Azotobacter* 5 kg ha^{-1}, T_5 : 50 % RDF (Through IOS) + 50% RDN (Though OS : FYM) *Azotobacter* 5 kg ha^{-1} + PSB 5 kg ha^{-1}, T_6 : 75 % RDF (Through IOS) + 25 % RDN (Through OS : FYM), T_7 : 75 % RDF (Through IOS) + 25 % RDN (Through OS : FYM) + *Azotobacter* 5 kg ha^{-1} and T_8 : 75 % RDF (Through IOS) + 25 % RDN (Through OS : FYM) + *Azotobacter* 5 kg ha^{-1} + PSB 5 kg ha^{-1} were evaluated on Greater yam cv. LOCAL. Planting of 200 to 250 g of seed yams or setts was done in the last week of May after giving the dry tuber treatment with mancozeb 1 kg + 5 kg of ash (@ 1000 kg cut pieces) and kept the treated pieces in the shade for 8 to 10 hrs, at spacing of 75 cm x 75 cm.

Entire quantity of organic manure (as Farm Yard Manure), bio-fertilizers (as *Azotobacter* and PSB : Phosphate solubilizing bacteria) was applied as basal dressing. Half dose of N (as Urea), full dose of phosphorus (as single super phosphate) and half dose of potash (as muriate of potash) was applied at 30 DAP at the time of weeding and earthing up. Rest of nitrogen and potash was applied at 60 DAP at the time of weeding and earthing up. Observations were recorded on plant height and tuber yield. Staking was employed to expose the leaves to sunlight. The data recorded during the period of investigation were statistically analyzed by appropriate procedure to randomized block design as describe by Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

A perusal of pooled mean of two years indicated that effect of INM treatments on yield of tuber was found significant (Table 1).



The tuber yield of *Dioscorea alata* L. cv. LOCAL. was significantly influenced by the various treatments. The highest mean tuber yield (31.44 t ha^{-1}) of two years (Table 1) was recorded with the treatment T_8 : 75 % RDF (Through IOS) + 25 % RDN (Through OS : FYM) + *Azotobacter* 5 kg ha^{-1} + PSB 5 kg ha^{-1} which was at par with the treatment of T_4, T_5 and T_7.

From this results it could be concluded that the 50 % nutrients requirement could be substituted through organic source as FYM without yield loss. The reason being that the application of FYM might have enhanced soil micro flora activity, besides supplementing nutrients. The combined application of *Azotobacter* and phosphate solubilizing bacteria (PSB) increased the availability of soil nitrogen and phosphorus.

The treatment consisting of FYM alone, which recorded lowest tuber yield of greater yam (25.11 t/ha), indicating that the use of organic source alone for fulfilling the requirement of total nutrition was insufficient.

Pooled analysis of two years data revealed that INM treatments on plant height, no. of vines per plant were found non-significant (Table 1).

This study proves the significance of integrated nutrient management in *Dioscorea alata* L. cultivation with bio-fertilizers and organic manures. No major pest and diseases were noticed during the period of investigation.

The results of the present investigation are in agreement with those reported by Behera *et al.* (2006) as well as Suja and Nair (2006).

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LITERATURE CITED

Behera, B., Mohanty, S.K. and Pal, A. K. (2006). Integrated plant nutrient supply for yam and maize intercropping system. *In* : *Root and tuber crops in nutrition, food security and sustainable environment* (Eds. Naskar, S.K., Nedunchezhiyan, M, Rajasekhara Rao, K; Sivakumar, P.S; Ray, R.C; Misra R.S and Mukhrajee, A.), Regional centre of CTCRI, Bhubaneswar, pp. 167-172.

Laxminarayan, K. (2008). Integrated nutrient management in tuber crops. *In : Advance techniques in quality planting material production and commercial cultivation of tropical tuber crops,* (Edited by : M. Nedunchezhiyan) Regional centre of CTCRI, Bhubaneswar, Orissa, India pp. 94-97.

Panse, V. G. and Sukhatme, P. V. (1967). *Statistical methods for agricultural worker*s. ICAR, New Delhi, pp. 187 – 197.

Singh, K.P. and Kalloo, G. (2000). Nutrient management in vegetable crops. *Fertil. News*, **45** (4) : 77 – 81.

Suja, G. and Nair, V. M. (2006). Resource management for white yam (*Dioscorea rotundata Poir*) intercropped in coconut gardens. *In : Root and tuber crops in nutriention, food security and sustainable environment* (Eds. Naskar, S.K., Nedunchezhiyan, M, Rajasekhara Rao, K; Sivakumar, P.S; Ray, R.C; Misra R.S and Mukhrajee, A.), Regional centre of CTCRI, Bhubneswar, pp. 153-61.

Virmani, S.M. (1994). UNCTAD Agenda – 21 : The new challenges for soil research. *J. Indian Soc. Soil. Sci.,* **42** : 516 – 524.

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