Research Paper

THE ASIAN JOURNAL OF HORTICULTURE
Vol. **6** | Issue 2 | December, 2011 | 365-368

Article history:
Received : 06.07.2011
Revised : 14.08.2011
Accepted : 30.09.2011

Influence of integrated nutrient management (INM) on yield and quality of Lemon (*Citrus limon* Burn.) cv. PANT LEMON-1 under Western U.P. conditions

■ VINUJ KUMAR[1], M.K.SINGH[1], BRAJ MOHAN, PAVITRA DEV[1] AND MONINDER[1]

Associated Authors:
[1]Department of Horticulture, Sardar Vallabh Bhai Patel University of Agriculture and Technology, MEERUT (U.P.) INDIA

Author for correspondence :
BRAJ MOHAN
Department of Horticulture, Sardar Vallabh Bhai Patael University of Agriculture and Technology, MEERUT (U.P.) INDIA

Abstract : The experiment was conducted at Horticulture Research Center of Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (U.P.) during 2009-10 in autumn and spring season. The experiment was laid out in randomized block design (RBD) with 3 replications. The data were found significantly effective with the application of integrated nutrient management. The maximum number of fruit/tree, fruit weight (g), fruit diameter (cm), fruit yield (kg/tree), juice content (%), acidity (%) and ascorbic acid (%) was found under the treatment (T_7) 50% NPK (210g N+140g P+210g K) +15 kg VC +5 kg NC followed by other treatment and minimum was found under the control.

Key words : Pant lemon-1, NPK, FYM, Vermi compost, Neem cake

How to cite this article : Kumar, Vinuj, Singh, M.K., Mohan, Braj, Dev, Pavitra and Moninder (2011). Influence of integrated nutrient management (INM) on yield and quality of Lemon (*Citrus limon* Burn.) cv. PANT LEMON-1 under Western U.P. conditions, *Asian J. Hort.*, **6** (2) : 365-368.

A large variety of fruits are grown in India. Fruits are rich source of various nutrients *i.e.* carbohydrates, vitamins, proteins, fats and minerals etc. Fruits have great value to fetch the maximum return by value added products. Among several cultivars of lemon grown in India, Pant lemon-1 is the most promising cultivar in western U.P. condition. It is a single plant selection from "Kagzi Kalan lemon" (Baldevraj, 1990).In developing countries like India, deficiency of vitamins C is quite common. This vitamin is useful in healing of wounds, developing stronger blood vessels and gums, giving strength to bones and protecting from cold and cough etc. Similarly, lemon is a good source of vitamin C compensates the deficiency symptoms of this vitamin through the plenty availability.The lemon oil is a stimulant and carminative when given internally as medicine. A recent emphasis has been given to the integrated nutrient management, combined use of organic and inorganic fertilizers at an optimum level, to supply the various plant nutrients. The evidence that the organic manure reduces the amount of chemical fertilizers for supplying both macro and micro-nutrients and to minimize the deficiency symptoms of nutrients in various fruit plants for sustainable fruit production, INM plays a vital role to enhance the quality production of fruits at low inputs by using INM. Results of long term fertilizer experimentation in Indian conditions clearly indicated that use of inorganic fertilizers along with organic manures sustained physico-chemical properties of soil (Numbiar and Ghose, 1984).The main object of INM is to minimize the inorganic fertilizers by using substitute organic sources, *i.e.* FYM, vermicompost, neem cake etc.

RESEARCH METHODS

The present investigation was carried out at Horticulture Research Center of Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, during the year 2009-2010 in autumn and spring season. The experiment was laid out in randomized block design (RBD) with three replications. Vermi compost and neem cake were applied before one week prior to fertilizers application and FYM was mixed in soil 15 days before fertilizers applications to the tree. The fertilizers were

applied separately in each tree in a ring made around the tree (60 cm away from the trunk). Respective doses of fertilizers were mixed thoroughly into 20 cm depth of soil. Full dose of FYM, vermi compost, neem cake, P, K and half dose of N were applied in first week of February and half of N in April-May. Nine year old uniform plants of lemon were selected for the experimentation. All the trees were maintained under uniform cultural practices during the course of investigation. The source of N, P and K, were urea, single super phosphate amd murate of potash and organic sources *i.e.* FYM, vermi compost and neem cake.

RESEARCH FINDINGS AND DISCUSSION

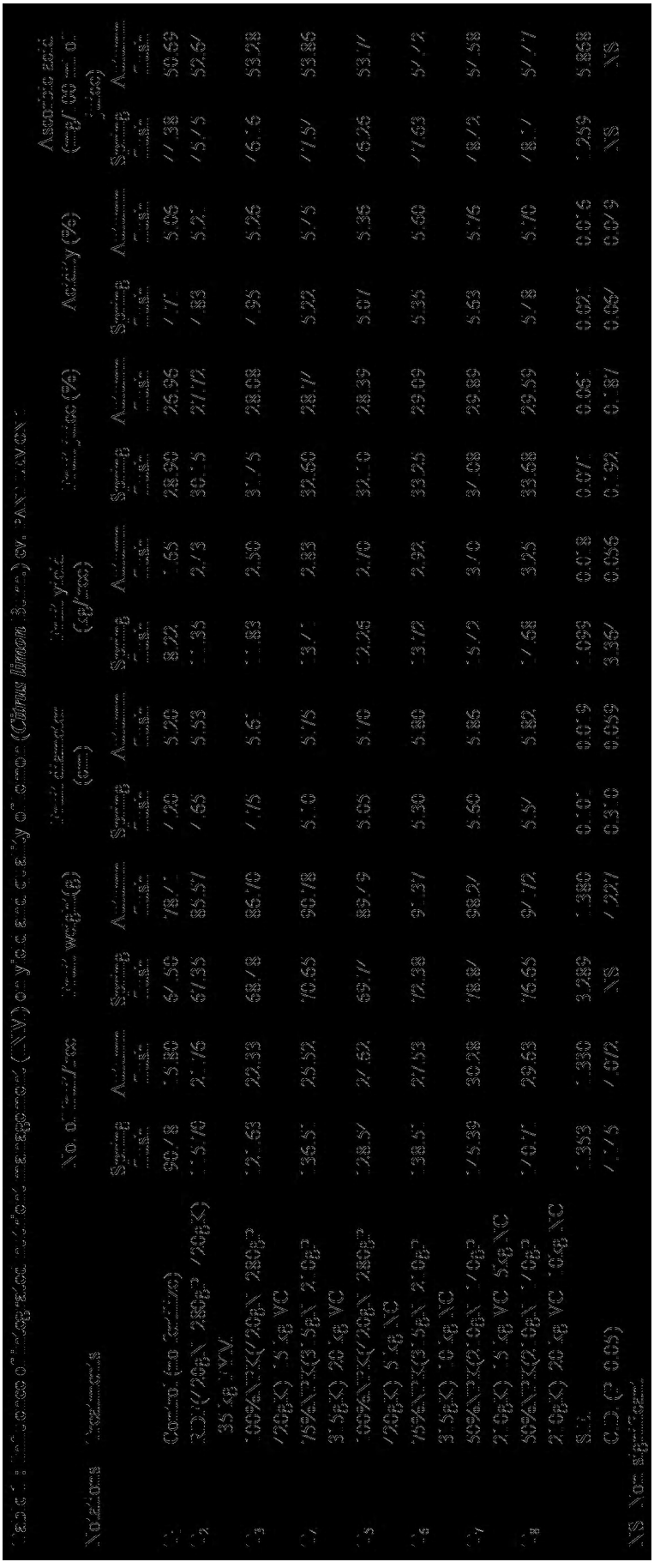
The results obtained from the present investigation have been discussed in the following heads :

Number of fruit/ tree:

The data presented in Table 1showed that the maximum no. of fruit per tree (145.39) were obtained with T_7 50 per cent NPK (210g N+140g P+210g K) +15 kg VC +5 kg NC followed by T_8 50 per cent NPK (210g N+140g P+210 g K) +20 kg VC +10 kg NC (140.71), in spring flush, however, minimum no. of fruits/tree were recorded in T_1(control)(90.48) in spring flush. Maximum number of fruits per tree (30.28) was obtained with T_7 in autumn flush, while minimum (15.80) was recorded under T_1 (control) in autumn flush. The number of fruit per tree were significantly in flounced by intergraded use of organic and inorganic fertilizers during the course of investigation, the effect of season on number of fruits are in line with the findings of Singh (1982) and Dilipbabu (1984) who observed higher yield in spring flush than autumn flush.

Weight of fruit (g):

Interaction of spring season and treatment was found non- significant while autumn season and treatment was found significant (Table 1). It was observed that heavier fruits were found in autumn season as compared to spring season. Autumn flush produced higher average fruit weight among different treatment combinations. However, maximum fruit weight (98.24 g) was recorded in autumn flush with T_7 50 per cent NPK(210 g N+140 g P+210 g K) +15 kg VC + 5



kg NC followed by T_8. The minimum (78.41g) fruits weight was recorded in T_1 (control). Maximum 78.84g fruit weight was recorded under T_7 in spring flush while was minimum (64.50) in T_1 (control). These result are in conformity with the result of Rathi (2004) who reported highest average fruit weight due application of 50 per cent recommendation dose of fertilizer +20 per cent vermicompost in other crops.

Fruit diameter (cm):

The data presented in the Table 1 showed that INM significantly influences diameter of fruits. Maximum (5.86) diameter of fruits was recorded with T_7 50 per cent NPK (210g N+140g P+210g K)+15 kg VC + 5 kg NC while, minimum (5.20) diameter of fruits was recorded with T_1 (control) in autumn flush. Maximum (5.60) fruit diameter was recorded in spring flush under T_7 while minimum (4.20) was recorded in T_1 (control) in spring flush. Fruit diameter clearly states that season, treatment and their combination had significant effect on diameter of fruit, smaller fruits were produced by control trees in both autumn and spring season. The smaller fruit size in spring season was associated with the heavier crop load which caused the drain of the fruit reserves of the tree on the one hand while increasing completion of among the growing fruit population for the food supply on the other, smaller fruit size due to heavier crop load have also been reported by Hayes (1957).

Fruit yield (kg/tree):

The data presented in Table 1 showed that INM had significant effect on fruit yield of lemon. The highest fruit yield (15.42 kg) was recorded under the treatment T_7 50 per cent NPK (210 g N+140 g P+210 g K) +15 kg VC + 5 kg NC in spring flush followed by T_8 while the minimum fruit yield (8.22 kg) was recorded under control in spring flush. Maximum fruit yield (3.40 kg) in autumn flush was recorded under T_7, while minimum fruit yield (1.65 kg) was observed with control in autumn season. The fruit yield (kg/tree) was significantly influenced by integrated nutrient management due to addition of macro nutrients, prolonged release of nitrogen and improved soil health, which make plant roots to proliferate, resulting in better utilization of nutrients. These results are, however in accordance with that of Beridze (1990) who observed that the highest yield of 6.6 t/ha was obtained from lemon trees receiving 50 per cent NPK (210 g N+140 g P+210 g K) +15 kg VC + 5 kg NC followed by T_8.

Juice content (%):

The data presented in Table 1 indicated that the maximum juice content was recorded under spring flush fruits. Data also revealed that treatments had significant influence on juice percentage of fruit which was recorded maximum (29.89 %) under T_7 50 per centNPK (210g N+ 140gP+210gK) +15kgVC + 5kgNC followed by T_8 50 per centNPK (210g N +140gP+ 210g K) +20kg VC+ 10kg NC (29.59) while, minimum juice per cent was noticed under control in autumn flush, which was lower than all treatments. Maximum (34.08 %) juice was recorded under T_7 in spring flush while, minimum (28.90) in control. Similar results were obtained by Singh (1982).

Acidity (%):

The maximum acidity content (5.76) was obtained in autumn flush fruits with T_7 50 per cent NPK(210 g N+140 g P+210 g K) +15 kg VC + 5 kg NC followed by T_8, while minimum acidity was recorded under the control in autumn flush (5.06). However, maximum (5.63) acidity was obtained under T_7 in spring flush whereas, minimum (4.71) was recorded in control. The acidity per cent was significantly affected with the application of integrated nutrient management due to that fruits were more acidic in autumn season as compared to spring season. These finding are in agreement with the results obtained by Chaudhary *et al*.(1975).

Ascorbic acid (%):

It is clear from the data presented in Table 1 that season had not significant effect on ascorbic acid content. The effect of interaction between season and treatments were also found to be non significant. Maximum ascorbic acid content (54.58) was noticed in autumn flush with T_7 50 per cent NPK (210 g N+140 g P+210 g K) +15 kg VC + 5 kg NC followed by T_8 while minimum ascorbic acid (50.69) content was recorded under the control in autumn flush fruits. The maximum (48.42) ascorbic acid content was obtained with T_7 in spring flush while, minimum (44.38) in control.

REFERENCES

Baldevraj (1990). Effect of growth regulators on the performance of lemon (*Citrus limon* Burm) cv. PANT LEMON-1. M.Sc Ag,(Hort.) Thesis. G.B. Pant University of Agriculture and Technology, Pantnagar, U.S. NAGAR, U.K. (India).

Bridze, T.R. (1990). The effect of organic fertilizers on lemon tree productivity. *Subtropicheskie-Kul'tury,* **3** : 83-86.

Chaudhary, D.N., Shayamal, N.R. and Maurya, K.R. (1975). Influence of inorganic and organic manures alone and in combination on growth, yield and chemical qualities of guava (*Psidium guajava* Linn.) *Indian Food Packer* Nov.-Dec., pp.24-26.

Dilipbabu (1984). Effect of different doses of N, P and K on growth, yield and quality of Pant lemon-1. M.Sc.Ag. (Hort.) Thesis. G.B. Pant University of Agriculture and Technology, Pantnagar, U.S. NAGAR, U.K. (India).

Hayes, W.B.(1957). Fruit growing in India. Kitabisthan, Allahabad.

Nambiar, K.K.M. and Ghosh, A.B.(1984). Highlights of research of long term fertilizers experiments in India. LTFE, Research Bulletin No. 1, New Dehhi, IARI, 97 pp.

Rathi, D.S.(2004). Studies on organic supplement to minimize inorganic fertilizer for supply of recommended NPK doses in low chill pear. Thesis, Ph.D. (Hort.). G.B. Pant University of Agriculture and Technology, Pantnagar, U.S. NAGAR, U.K. (India)..

Singh, Balraj (1982). Effect of various levels of nitrogen on growth, yield and quality of lemon (*Citrus lemon,* Burn.). M.Sc. Ag. (Hort.) Thesis. G.B.Pant University of Agriculture and Technology, Pantnagar, U.S. NAGAR, U.K. (India).

****