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Short Communication

Influence of components of INM on plant growth of acid lime

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In Andhra Pradesh, the important citrus species are both acid lime (*Citrus aurantifolia*) and sweet orange(*Citrus sinensis*). Acid lime is grown in arid and semi-arid regions of many districts. Due to more remunerative price, new acid lime plantations are raised in less suitable soils like calcareous soil, which need special attention in nutrition otherwise growth and productivity of orchards is reduced. In recent years, citrus farmers are habituated in using the readily and easily available chemical fertilizers regularly with decreased use of organic manures *viz.*, FYM, compost, oil cakes and green leaf manure due to shortage of their availability in bulk quantities as well as transport and labour cost(Aariff Khan, 2001).

Among the organic inputs, press mud as a waste product of sugar factory is a source of many nutrients and organic carbon. There are nearly fifteen sugar factories operating in and around the state. Iron pyrites a waste product in iron and coal mines is most useful for calcareous soils as it is a cheap source of both iron and Sulphur could be effectively utilized for improving the citrus productivity under calcareous soils. Vesicular arbuscular mycorrhizae(VAM) is most important biofertilizer suitable for citrus orchards as it has strong affinity with citrus roots, In view of the increased availability of press mud and dwindling supply of FYM, investigations have thus become imperative to assess their combinations and dosages levels of all possible organic, bio fertilizer input with and with out iron pyrites as inorganic input.

MATERIALS AND METHODS

Field experiment was conducted on 3 years old acid lime seedlings cultivar kagzi lime for 2 consecutive years in 1997-98 and 1998-99 at citrus research station, Petlur, Nellore district, Andhra Pradesh. The experiment was laid out with 19 treatments replicated thrice by fallowing randomized block design. Well decomposed farm yard manure at 2 levels @ 25 and 50 kg/plant, press mud at 2 levels @ 4 and 8 kg/plant as organic source, iron pyrites as inorganic source at 3 levels @ 100, 200 and 300 g/plant and VAM as biofertilizer @ 150 g/ plant is used for the present study. In addition to a recommended dose of N, P_2O_5, K_2O(1125-450-600 g/plant for three year aged and 1500-600-800 g/plant for four year old) in 2 split doses i.e. in January and July were applied uniformly to all plants. Out of the recommended dose of nitrogen, 50% was supplied through urea and the remaining through organic manure i.e. 25% N each through FYM and neem cake. Where as entire dose of P_2O_5 and K_2O were supplied by super phosphate and muriate of potash respectively.

The experimental surface and sub soil is slightly alkaline(8.25-8.69), non-saline (0.24-0.32 d S/m) and calcareous nature ($CaCO_3$ 16.5-20.5%) with very low organic carbon content(0.28-0.12%). Growth parameters such as height, girth and volume were recorded

Table 1: Plant growth characters of acid lime as influenced by Integrated Nutrient Management

Tr No.	Treatment	Initial Height	First Year	Second Year	Initial Volume	First Year	Second Year
		(---------- m ----------)			(---------- m^3 ----------)		
T_1	Contro	2.10	2.42	2.94	4.90	6.10	8.87
T_2	Iron Pyrites (IP) 100 g/plant	2.08	2.59	3.26	5.18	7.27	11.25
T_3	Iron Pyrites (IP) 200 g/plant	2.04	2.73	3.40	5.05	7.58	11.68
T_4	Iron Pyrites (IP) 300 g/plant	2.03	2.84	3.59	5.02	7.96	12.25
T_5	FYM 25 kg /plant	2.10	2.95	3.66	5.02	8.20	12.63
T_6	FYM 50 kg/plant	2.00	3.20	4.02	5.01	8.77	13.62
T_7	Press mud (PM) 4 kg/plant	1.98	2.92	3.60	5.00	8.12	12.30
T_8	Press mud (PM) 8 kg/plant	2.02	3.11	3.90	4.91	8.69	13.47
T_9	FYM 25 kg + IP 100 g/plant	2.06	3.00	3.76	4.87	8.28	12.82
T_{10}	FYM 25 kg + IP 200 g/plant	1.97	3.16	3.94	5.03	8.74	13.36
T_{11}	PM 4 kg + IP 100 g/plant	2.04	2.93	3.63	5.01	8.22	12.45
T_{12}	PM 4 kg + IP 200 g/plant	2.05	3.09	3.73	5.04	8.50	12.97
T_{13}	FYM 12.5 kg + PM 2 kg + IP 100 g/plant	2.01	2.95	3.74	5.10	8.08	12.02
T_{14}	FYM 12.5 kg + PM 2 kg + IP 200 g/plant	2.04	3.11	3.82	5.05	8.27	12.76
T_{15}	FYM 25 kg + PM 2 kg + IP 100 g/plant	2.03	3.04	3.85	4.86	8.31	13.03
T_{16}	FYM 25 kg + PM 2 kg + IP 200 g/plant	2.00	3.20	3.99	4.80	8.78	13.78
T_{17}	VAM 150 g/plant	2.02	2.58	3.24	4.90	7.20	11.06
T_{18}	VAM + IP 100 g/plant	1.98	2.72	3.32	5.00	7.39	11.44
T_{19}	VAM + IP 200 g/plant	2.03	2.80	3.48	5.02	7.88	12.18
Mean		-	2.91	3.62	4.99	8.02	12.31
SE (M)±		-	0.10	0.13	-	0.28	0.61
C.D at 5%		-	0.29	0.37	-	0.80	1.70

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at the beginning of the experiment and at end of first and second year. Plant height was measured by using a measuring scale and tape. Where as, volume was measured by canopy spread as referred by Hucheche *et al*. (1996).

The results on plant height (Table 1) showed significant effect by the type of manure and iron pyrites either individual or together at first and second year. The maximum plant height was recorded at the end of first(3.2 m) and second year (4.02 m) by the application of individual higher dose of FYM @ 50 kg/plant (T6) very closely followed by the combined treatment i.e. FYM 25 kg + PM 2 kg + IP 200 g/ plant(T16) to the tune of 3.2 and 3.99m. The increase in plant height growth might be due to higher dose of FYM is a source of several nutrients and also improving soil physical conditions and nutrient availability(Brar and Rekhi, 2000). The reason for combination treatment is, integrated use of iron pyrites with FYM and PM ascribed to be increase in nutrient composition in leaf and more photosynthetic activity (Beaulah *et al*. 2004). The poor growth and lowest height (2.42 and 2.94 m) in control plants in both years was registered due to poor nutrient supply to leaf tissues.

The results revealed that plant volume was significantly effected by the type of manure and iron pyrites either alone or together. As the duration increases from 12 to 24 months the volume also increased(Table 1). The highest volume was recorded in the treatment with combined application of FYM 25 kg + PM 2 kg + IP 200 g/plant i.e. T16(8.78 and 13.78 m^3) very closely followed by individual higher dose of FYM 50 kg/planti.e.T6 (8.77 and 13.62 m^3) in both the years. The reasons might be the efficiency of iron pyrites along with FYM and PM is better in supply of nutrients and increasing the leaf nutrient content, leaf area and more number of branches as well as wide canopy spread resulting the higher photosynthetic activity (Goramnagar, 2000). Inoculation of VAM with iron pyrites at 200 g/ plant (T19)also increased the growth characters significantly over control and comparatively better than individual lower dose of iron pyrites i.e. 100 g/plant (T2) and VAM alone(T17). Presence of VAM increases the root surface area for absorption and also releases exudates and chelating compounds in rhizosphere which lead to nutrient availabity and production of different growth factors including ectoenzymes and hormones (Antunes and Cardo, 1991).

It was concluded that growth characters, plant height and volume of acid lime was significantly influenced by the application of either alone higher dose of FYM @ 50 kg/plant or integrated use of iron pyrites @ 200 g along with FYW 25 kg + PM 2 kg/plant are superior for obtaining better growth performance.

REFERENCES

Aariff Khan, M.A. (2001). Nutrient Status and Integrated nutrient management in Acid lime (*Citrus aurantifolia.* Swingle) orchards grown on red calcareous soils of Nellore district, Ph.D.Thesis submitted to Acharya. N.G. Ranga Agricultural University, Hyderabad.

Antunes, V. and Cardso, E.J.B.N. (1991). Growth and nutrient status of citrus plants as influenced by mycorrhizae and phosphorous application. *Plant and Soil.* **131:**11-19.

Beaulah, A. Vadivel, E. and Rajadurai, K.R. (2004). Effect of organic and inorganic fertilizers on growth characters of Moringa (*Moringa oleifera*) cv.PKM-1. *South Indian Horti*. **52 (1-6):**183-193.

Brar, S.P.S. and Rekhi, R.S. (2000). Farm Yard Manure – its nutrient value and effects on crop production. *Progressive Farming*. **4 :**12-13.

Goramnagar, H.B. Gondane, S.U. Rafeekher, M. Sorte, P.N. and Murkute, A.A. (2000). Studies on integrated nutrient management in Nagpur Oranges. *J. Soils and Crops*. **10:** 289-291.

Hucheche, A.D. Dass, H.C. Lallan Ram, Srivastava, A.K. and Kholi, R.R. (1996). Response of acid lime (*Citrus aurantifolia*) to nitrogen fertilization. *Indian. J. Horti.* **53 (1):**14-18.

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