

## Effect of Chemical Fertilizers in Combination with Manure on the Physico-chemical Characters of Loquat at Lower Altitude of Murree Hills.

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**Abstract:** During 1997, maximum weight of the fruit (16.46 g), weight of flesh (14.46 g), seed size in length and diameter (1.81×1.30 cm) and least acidity (0.65 %) was observed in the fruit obtained from the trees which were applied with nitrogen in combination with phosphorus and potash. The trees where no fertilizer was applied, produced the smallest fruit of low quality. The use of potash has significantly reduced the acidity of pulp. But the fertilizer could not affect the T.S.S. contents. Whereas, during the year 1998, the fertilizers significantly increased the T.S.S. contents against untreated plants. Hence, 1 kg of nitrogen in combination with 0.75 Kg phosphorus and 0.50 Kg potassium along with 40 Kg of F.Y.M. per tree is recommended for full grown loquat plants.

**Key words:** Fertilizers, manure, loquat, yield, T.S.S., acidity, flesh fruit weight and seed size

### Introduction

The most suitable level of NPK and FYM is the key to success of cultivation of any fruit tree. MuthuKrishnan and Srinivasan (1974) found favourable effect of K on T.S.S. in grapes. Koo and Reese (1977) working in Florida found that high N rate (448 Kg/ ha) in "Dancy" tangerine and (266 Kg N/ ha) in "Tample" oranges increased yield and acid contents and reduced TSS/ acid ratio. Verma and Nijjar (1978) found that 454 g N with 500 g P and 410 g K per vine gave the highest yield and T.S.S. in "Perlette" grapes in Punjab. Singh (1986) reported that 60 Kg mixture of well rotten FYM, bone meal and wood-ash (100: 5: 10) should be applied to each grown up tree. He further recommended 50 Kg FYM, 250 g N, 250 g P and 500 g K to ten year old loquat trees, annually. Olson *et al.*, (1987) observed reduction in the fruit size, T.S.S. of prunes by low K level in the trees. Nijjar (1990) suggested that soil application of 873 g P per grape vine in combination with 500 g N and 410 g K would produce berries with highest T.S.S. contents. Similarly, Singh (1990) recommended 250 g N, 250 g P, 500 g K and 50 Kg FYM for ten year old grafted trees of loquat under Indian Punjab climatic conditions. The relationships on fruit weight in loquat cultivar, Mogi and various factors were investigated by Uchino *et al.*, (1994). The number of leaves on bearing shoots did not influence fruit weight but the number of days to ripening, heat summation from flowering to ripening, seed number and seed weight influenced the fruit weight.

### Materials and Methods

The present trial was conducted at Hill Fruit Research Sub Station, Chharapani, Murree during the years 1997-98 on 24 loquat trees of 10 year age. Forty Kg of FYM was applied to all of the plants during December each year as a constant factor. Whereas, the four different doses of NPK per plant were (0-0-0 Kg), (1-0-0 Kg), (1-0.75-0 Kg) and (1-0.75-0.50 Kg), respectively. Half of the nitrogen and full doses of phosphorus and potash were applied under the canopy of the trees in first fortnight of February and the remaining half dose of nitrogen was given to the fruit trees after completion of the fruit setting.

Twenty-four fully ripened fruits were picked up randomly from all sides of tree for data collection. Determination of fruit weight (g), flesh weight (g), seed weight (g), fruit size (cms), T.S.S. (%) and acidity (%). The titratable acidity of the flesh was estimated by titration against standard NaOH solution as

suggested by AOAC (1989) which was expressed as percent of anhydrous citric acid. The total soluble solids of the flesh, extracted by hand, were determined with the help of Brix Refractometer (%). Data were analyzed by using ANOVA and Duncan's New Multiple Range Test (DMR test) at  $p=0.05$  was applied to compare the treatment means (Steel and Torrie, 1990).

### Results and Discussion

**Fruit Size:** The fruit size both in length and diameter measured in centimeters was found significant during 1997 and 1998 (Table 1). Maximum length was attained by the fruits harvested from the trees where nitrogen in combination with phosphorus and potash was applied followed by nitrogen in combination with phosphorus and nitrogen alone. Minimum length was recorded where no any kind of fertilizer was applied. Fruit size in diameter was not responded with fertilizers during first year. However, during second year, both length and diameter were affected in the same fashion, as of length during first year.

**Fruit Weight:** The differences among various treatments for fruit weight were statistically significant (Table 1). During first year, maximum fruit weight was noted in the lot where all fertilizers were applied followed by two fertilizers and only nitrogen fertilizer. The fruit weight in control lots was the minimum. Similar results were noted during the second year.

**Flesh Weight:** Flesh weight of loquat fruit is significant (Table 1). Maximum flesh weight per fruit was noted where nitrogen in combination with phosphorus and potash was applied followed by nitrogen in combination with phosphorus and nitrogen alone. Minimum flesh weight was noted where no fertilizer was applied during 1997. Almost similar trend was noted during 1998.

**Seed Weight:** During the first year, it was noted from the experimental data (Table 1) that minimum seed weight per fruit was noted where three types of fertilizers viz., nitrogen, phosphorus and potassium were applied followed by two types of fertilizers viz., nitrogen and phosphorus and only one fertilizer viz., nitrogen. The seed weight was maximum where no fertilizer was applied.

**Total Soluble Solids:** Maximum Total Soluble Solids (TSS) were

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Table 1: Physico- Chemical Characters of Loquat Fruit as Influenced by Fertilizer Application.

Parameters	Years	Treatment Means				L. S. D. Value at 5%
		(N-P-K) (0-0-0)	(N-P-K) (1-0-0)	(N-P-K) (1-0.75-0)	(N-P-K) (1-0.75-0.50)	
Fruit Length (cms)	1997	1.38 c	1.50 b	1.71 a	1.81 a	0.112
	1998	1.40 c	1.50 c	1.70 b	1.90 a	0.115
Fruit diameter (cms)	1997	1.17	1.16	1.21	1.30	-
	1998	1.10 b	1.20 ab	1.20 ab	1.30 a	0.123
Fruit Weight (g)	1997	13.50 c	13.48 c	15.05 b	16.46 a	1.024
	1998	14.66 bc	14.20 c	15.40 ab	16.20 a	1.160
Flesh Weight (g)	1997	10.86 c	11.25 c	12.86 b	14.46 a	1.046
	1998	10.70 c	11.30 c	13.20 b	15.00 a	0.709
Seed Weight (g)	1997	2.63 a	2.28 b	2.31 b	2.07 b	0.283
	1998	2.60 a	2.50 a	2.40 a	2.05 b	0.210
TSS (%)	1997	15.63	16.20	16.05	16.20	-
	1998	16.00	16.30	16.30	16.40	-
Acidity (%)	1997	0.71 a	0.70 a	0.70 a	0.65 b	0.020
	1998	0.71 a	0.72 a	0.71 a	0.63 b	0.017

produced by the treatment where nitrogen in combination with phosphorus and potash was applied followed by nitrogen in combination with phosphorus and nitrogen alone. Minimum TSS was noted in the fruit harvested from the trees where no any kind of fertilizer was applied. The differences were, however, non-significant during both years of studies as shown in Table 1.

**Acidity:** It is evident from the data presented in Table 1 that means were significant during 1997 and 1998. Minimum acidity was noted in the fruit harvested from the trees where nitrogen in combination with phosphorus and potash was applied. Nitrogen alone or in combination with phosphorus did not respond to acidity as these treatments were at par to control.

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