

# Studies on Yield and Yield Contributing Characters of Different Type of Khasi Mandarin (*Citrus Reticulata* L. Blanco) Orange Gardens at Lower Dibang Valley District of Arunachal Pradesh

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**Abstract** - The study was undertaken to know the present status of the Khasi mandarin orange gardens of Lower Dibang Valley district of Arunachal Pradesh. A baseline survey was done prior to the investigation and likewise twenty four gardens were selected randomly from the region and grouped into three gardens viz. small, medium and large garden. Observations were taken on yield and yield attributing characters of the gardens. It has been observed that among the different types of garden small garden recorded highest in terms of yield and yield attributing characters of the plant.

**Keywords:** Khasi Mandarin, Yield, Large Garden, Medium Garden, Small Garden

## I. INTRODUCTION

Citrus occupies about 961.1 thousand hectares of land and produces annually 9452.1 thousand metric tones of fruits in India (NHB, 2010). Among the different species of citrus grown in India, Mandarin Orange occupies the major portion. The mandarin growing belts of the country may be divided into four regions via. Punjab where mostly Kinnow Oranges is dominating, Nagpur belt where mostly Nagpur Oranges are grown. Next is the eastern foot hills of Nilgiri (Coorg region) where Coorg Mandarin are grown. Lastly, Meghalaya, Arunachal Pradesh, Assam and surrounding foothills where Khasi Mandarin are predominantly grown. In Arunachal Pradesh major Khasi Mandarin growing belts are the East Siang, West Siang and Lower Dibang Valley district. The total area covered Citrus in Arunachal Pradesh is 25000 hectares and produced 37780 tonnes of fruits of which Lower Dibang Valley occupies 2780 hectares of land under citrus out of which Orange area is 762 hectares under bearing and 1456 hectares under nonbearing and produces 5715 tonnes (Anon, 2010). In the Lower Dibang Valley district Roing area is well known for the production of mandarin, a few pockets of Mandarin growing belts are also prevailing around Balek.

## II. MATERIALS AND METHODS

A base line survey is conducted during 2010-11 in predominantly citrus growing tracts of Lower Dibang Valley district. The existing gardens of those tracts are divided into three groups based on the number of plants exists in each garden as follows:

- I. Large garden: More than 200 plants
- II. Medium garden: 50-199 plants
- III. Small garden: Less than 50 plants

From each categories of the gardens, 8 gardens of similar age i.e. 24 gardens of three strata are selected for the study. From each of the selected gardens 10 plants are selected randomly for different observations. 240 numbers of plants in total are selected from all type of garden for the study.

Main items of observation are - Yield of the plant, Number of fruits per plant, Fruit weight, Fruit Diameter and Fruit length

The sampling design for this experiment was stratified Random Sampling.

## III. RESULTS AND DISCUSSION

Results of the present studies revealed that there was significant difference among the various types of the gardens.

### A. Fruit Yield

The comparison of the yield performance of the large, medium and small gardens were found to be highly significant. The average fruit yield recorded in the small garden (104.62 kg/plant) is highest followed by medium gardens (38.17 kg/plant) and large gardens (14.07 kg/plant)

### B. Number of Fruits Per Plant

Variation in number of fruit among the gardens in medium and small sized gardens were found to be significant, but the gardens within the large size group did not show

significant differences in number of fruit per plant. Variation in production in number of fruit per plant was found to be significant among the type of gardens. The highest value of number of fruit per plant was recorded in small garden(508.03) followed by medium gardens(336.68) and large gardens(190.4).

**C. Fruit Weight**

It is observed that fruit weight increased with the reduction in size of the gardens. The highest fruit weight recorded in small gardens (205.8 g) followed by medium gardens(114.02g) and large gardens(77.0 g).

**D. Fruit Diameter**

From the studies of fruit diameter it had been revealed that, with the increase in the size of the gardens the fruit diameter decreased considerably. The highest fruit diameter (8.33 cm) was observed in small gardens followed by medium gardens(6.53 cm) and large gardens(5.41 cm).

**E. Length of Fruit**

It is observed that fruit length increased with the reduction in size of the gardens. The highest fruit length recorded in small gardens (6.59 cm.) followed by medium gardens(5.15cm.) and large gardens(4.41 cm.).

TABLE I DIFFERENT YIELD AND YIELD CONTRIBUTING CHARACTERS

Gardens	Yield (kg/plant)		
	Large Garden	Medium Garden	Small Garden
G <sub>1</sub>	12.48	37.63	104.55
G <sub>2</sub>	14.80	36.10	106.04
G <sub>3</sub>	15.90	38.89	97.82
G <sub>4</sub>	14.06	38.10	99.30
G <sub>5</sub>	13.08	38.99	105.01
G <sub>6</sub>	16.37	39.97	111.92
G <sub>7</sub>	13.05	39.00	105.64
G <sub>8</sub>	12.89	36.69	106.73
Mean	14.07	38.17	104.62
SEd	1.69	1.10	3.48
CD(0.05)	3.36	2.18	6.89

TABLE II COMPARISON OF THE YIELD PERFORMANCE OF THE LARGE, MEDIUM AND SMALL GARDENS

Gardens	Number of fruits per plant			Fruit weight (gm)			Fruit diameter (cm)			Fruit length (cm)		
	Large Garden	Medium Garden	Small Garden	Large Garden	Medium Garden	Small Garden	Large Garden	Medium Garden	Small Garden	Large Garden	Medium Garden	Small Garden
G <sub>1</sub>	179.4	336.9	514.8	77.0	114.4	206.2	5.53	6.63	8.23	4.50	5.23	6.53
G <sub>2</sub>	212.8	325.9	494.8	77.8	111.0	211.2	5.36	6.43	8.53	4.30	5.26	6.80
G <sub>3</sub>	199.9	342.8	492.8	77.0	114.4	209.6	5.30	6.70	8.36	4.10	5.23	6.66
G <sub>4</sub>	173.4	329.1	481.1	78.2	116.2	203.2	5.43	6.56	8.26	4.43	5.16	6.56
G <sub>5</sub>	188.8	342.8	521.3	77.0	115.4	203.0	5.30	6.46	8.23	4.23	5.06	6.53
G <sub>6</sub>	182.5	344.4	520.2	77.0	115.2	203.8	5.40	6.50	8.46	4.49	5.10	6.76
G <sub>7</sub>	196.7	335.7	528.7	76.6	114.8	204.6	5.46	6.56	8.50	4.73	5.13	6.80
G <sub>8</sub>	189.7	335.9	510.6	75.4	110.8	204.8	5.50	6.46	8.10	4.50	5.06	6.13
Mean	190.4	336.68	508.03	77.0	114.02	205.8	5.41	6.53	8.33	4.41	5.15	6.59
SEd	14.61	4.11	11.49	0.94	2.78	2.83	0.26	0.14	0.08	0.21	0.15	0.09
CD(0.05)	NS	8.13	22.76	NS	NS	5.61	NS	NS	0.16	NS	NS	0.18

#### IV. CONCLUSION

Results obtained from the present studies regarding length and diameter of the mandarin oranges are in agreement with the reports of Ghosh *et al.* (1982) who has found the similar findings from the different parts of the North Eastern region. The yield is a complex character which is dependent directly or indirectly on different yield attributing and fruit characters. Higher fruit number per plant and higher fruit weight directly attributed to higher yield performance of the small gardens. The results of the investigation can be summarized that among the different type of mandarin gardens in Lower Dibang Valley district of Arunachal Pradesh small gardens attributed highest yield and yield contributing characters comparatively higher than other types of garden.

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