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Study on the fruit characters and yield potential of different types of mandarin (*Citrus reticulata* L Blanco) orange gardens in Lower Dibang Valley district of Arunachal Pradesh

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ABSTRACT

The present investigations were undertaken to know the present status of the 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 categories viz small, medium and large. Observations were taken on fruit characters and yield potential of the gardens. It was observed that among the different types of gardens small gardens proved best in terms of fruit characters and yield potential of the plants. 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.

Keywords: Mandarin; fruit characters; yield; large garden; medium garden; small garden

INTRODUCTION

. In India citrus is the third most important fruit crop after mango and banana. Citrus occupies about 961 thousand hectares of land and produces annually 9,452 thousand metric tonnes of fruits in India (www.nhb.gov.in). 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 viz Punjab where mostly Kinnow oranges are dominating, Nagpur belt where mostly Nagpur oranges are grown, Eastern foothills of Nilgiri (Coorg region) where Coorg mandarin is grown and Meghalaya, Arunachal Pradesh, Assam and surrounding foothills where Khasi mandarin is 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 by citrus in Arunachal Pradesh is about 25,000 hectares and produces 37,780 tonnes of fruits of which Lower Dibang Valley occupies 2,780 hectares of land under citrus out of which orange area is 762 hectares under bearing and 1,456 hectares under nonbearing and produces 5,715 tonnes of fruits (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.

MATERIAL AND METHODS

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

Large garden - more than 200 plants
Medium garden - 50-199 plants
Small garden - less than 50 plants

From each category 8 gardens of similar age ie 24 gardens of three strata were selected for the study. From each of the selected gardens 10 plants are selected randomly for different observations. Thus in total 240 plants were selected and data were taken on number of fruits per plant, fruit weight, fruit diameter, fruit length and yield of the plant.

The sampling design for this experiment was stratified random sampling.
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RESULTS

Results of the present study (Table 1) reveal that there were significant differences among the various types of the gardens which are explained as under:

Number of fruits per plant

Variation in number of fruits among the gardens in medium and small sized gardens was 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 number of fruits per plant was found to be significant among the gardens. The highest number of fruits per plant was recorded in small gardens (508.03) followed by medium gardens (336.68) and large gardens (190.4).

Fruit weight

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

Fruit diameter

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 (6.53 cm) and large gardens (5.41 cm).

Table 1. Fruit characters and yield of mandarin (*Citrus reticulata* L Blanco) orange gardens

Gardens	Number of fruits/plant			Fruit weight (g)			Fruit diameter (cm)			Fruit length (cm)			Yield (kg/plant)		
	LG	MG	SG	LG	MG	SG	LG	MG	SG	LG	MG	SG	LG	MG	SG
G1	179.4	336.9	514.8	77.0	114.4	206.2	5.53	6.63	8.23	4.50	5.23	6.53	12.48	37.63	104.55
G2	212.8	325.9	494.8	77.8	111.0	211.2	5.36	6.43	8.53	4.30	5.26	6.80	14.80	36.10	106.04
G3	199.9	42.8	492.8	77.0	114.4	209.6	5.30	6.70	8.36	4.10	5.23	6.66	15.90	38.89	97.82
G4	173.4	329.1	481.1	78.2	116.2	203.2	5.43	6.56	8.26	4.43	5.16	6.56	14.06	38.10	99.30
G5	188.8	342.8	521.3	77.0	115.4	203.0	5.30	6.46	8.23	4.23	5.06	6.53	13.08	38.99	105.01
G6	182.5	344.4	520.2	77.0	115.2	203.8	5.40	6.50	8.46	4.49	5.10	6.76	16.37	39.97	111.92
G7	196.7	335.7	528.7	76.6	114.8	204.6	5.46	6.56	8.50	4.73	5.13	6.80	13.05	39.00	105.64
G8	189.7	335.9	510.6	75.4	110.8	204.8	5.50	6.46	8.10	4.50	5.06	6.13	12.89	36.69	106.73
Mean	190.4	336.7	508.0	77.0	114.0	205.8	5.41	6.53	8.33	4.41	5.15	6.59	14.07	38.17	104.62
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	1.69	1.10	3.48
$CD_{0.05}$	NS	8.13	22.76	NS	NS	5.61	NS	NS	0.16	NS	NS	0.18	3.36	2.18	6.89

LG= Large Garden; MG= Medium Garden; SG= Small Garden

Length of fruit

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

Fruit yield

The differences in 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) was highest followed by medium (38.17 kg/plant) and large gardens (14.07 kg/plant).

DISCUSSION

Results obtained in the present study regarding length and diameter of the mandarin oranges are in agreement with the reports of Ghosh et al (1982) who found the similar findings in 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.

It is concluded that among the different types of mandarin gardens in Lower Dibang Valley district of Arunachal Pradesh small gardens attributed highest fruit characters and yield as compared to other types of gardens.

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