BIBLIOGRAPHY

BOLISLIS, MARGIE D. OCTOBER 2009. Growth and Yield Performance of Bell Pepper (*Capsicum anuum L.*) as Affected by Spacing. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

The study was conducted to determine the effect of spacing on the growth and yield of bell pepper and to determine the optimum spacing for the crop.

Plant spacing significantly affected the growth and yield performance of bell pepper. Results showed that although early flowering was observed in plants having closer spacing, plants given wider spacing were taller and had heavier and larger fruits and higher marketable yield.

Bell pepper 'California Wonder' could be spaced 40 cm x 50 cm for better growth and higher yield of the crop.

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INTRODUCTION

Bell pepper is a cultivar group of the species *Capsicum anuum*. Cultivars of the plant produce peppercons which develop into fruits in different colors, including red, yellow, green and orange. Bell peppers are sometimes grouped with less pungent pepper varieties as "sweet peppers". Peppers are native to Mexico, Central America and Northern South America. Pepper seeds were later carried to Spain in 1493 and from there spread to other European and Asian countries (Anonymous, 2005).

Bell pepper is one of the major fruit vegetable crops that can be used for salad, pickles, stiffing and relish trays. It can be used for scenting cosmetics and soap as well as corminature, antiseptic and various ointment that can cure dropsy, colic and toothaches. It contains some vitamins and minerals such as Vitamin C or ascorbic acid, phosphorous , and calcium (Anonymous, 2005).

It is believed that high yield and normal growth can be obtained from bell pepper if proper cultivation practices such as proper planting and spacing are observed. Plant spacing affects plant growth and development due to competition for light, nutrient elements, soil moisture, air and space (Bautista and Mabesa, 1977).

Determining the distance of planting in every crop minimize waste of expensive seeds per unit area and increasing the yield with higher profit (Canuto, 1996). Determining the appropriate spacing requirement to ensure an effective vigorous plant growth and good yield is important. Spacing is a practical way of preventing crops firm competing with each other in the absorption of nutrients and utilization of light, which also provide the crops for full development. In addition, proper spacing prevents rotting and avoid over crowding of the plants (Bilango, 1996).

The study was conducted to determine the effect of spacing on the growth and yield of bell pepper and to determine the optimum spacing for the crop.

Time and Place of Study

The study was conducted at the Balili experiment farm, Benguet State University, La Trinidad, Benguet from October 2008 to April 2009.

REVIEW OF LITERATURE

Description of Bell Pepper

Bell peppers grown in temperate regions are herbaceous annuals, but are herbaceous perennial where temperatures do not drop below freezing. Plant growth habit maybe prostate, compact, or erect, but it is determinate in that after it produces nine to eleven leaves and single stem terminates in flower. Plants generally have small flowers and a bell-like fruit, botanically a berry. It is grown for edible fleshy fruit produced by this dichotomous growth. Many seeds are contained within the fruit walls, the pungent flavor comes from *capsaicin*, a compound found in the walls of the fruit (Anonymous, 2005).

Importance of Bell Pepper

Bell peppers are packed with several nutrients. They are a good source of Vitamin C, thiamine, Vitamin B_6, beta carotene and folic acid. Bell peppers also contain a large amount of phyto chemicals that have exceptional antioxidant activity. Those phytochemicals include chlorogenic acid, zea xanthin, and coumeric acid. When comparing the nutrient values of the different bell peppers, studies have shown that red pepper has significantly higher levels of nutrient that green. Red bell peppers also contain lycopene, which is a carotene that helps to protect against cancer and heart disease (Work and Carew, 1955).

Possibly due to their Vitamin C and beta carotene content, bell peppers have been shown to be protective against cataracts. Just like nutrient-dense vegetables, bell peppers have also shown to prevent blood clot formation and reduce the risks of heart attacks and

strokes probably due to their content of substances such as Vitamin C, capsaicin and flavonoids (Mendiola, 1958).

Soil Requirements

Work and Carew (1955) as cited by Salingbay (1996) states that bell peppers need high amounts of nitrogen, potassium and phosphorous. Bell peppers like well drained soil in full sun. The plant does well in raised beds filled with good top soil mixed with compost and rotted manure and pH near neutral (7.0) is ideal.

Climatic Requirement

Plants thrive best when the temperature is warm. Being sensitive to the cold, planting should be delayed until the danger of frost is past in the spring. Ideal temperatures are 70-80ºF during the day and 60-70ºF at night (Anonymous, 2005).

Extremely high temperatures (90º F or above) during flowering often results in blossom drop. Fruit that set when temperatures average above 80º F maybe small and poorly shaped due to heat injury to the blossoms. Temperature below 60ºF at night will also result in blossom drop (Anonymous, 2005).

Planting

Bell pepper is usually transplanted rather than directly in the garden. Plant seeds in seedling flats, beds, or pots, starting two weeks after germination, fertilize the seedling weekly, preferably with a solution of about 1 tablespoon of a water-soluble fertilizer in 1 gallon of water. The seedling will be ready to be transplanted in about 6 to 8 weeks (Anonymous, 2005).

Effect of Plant Spacing

In 1975, Mc Collum mentioned that the planting distance between plant in rows vary depending upon the system of cultivation and irrigation used and the cultivars grown. The same author stated that distance between rows in single row system should not be greater than 45 cm.

On the other hand, Knott (1967) as cited by Lasuna (2006) stated that on rich soil with abundant moisture, the distance between plants can be closer. Moreover, Bautista and Mabesa (1977) reported that as plant population per unit area increases the yield per unit area and increases also until the spacing is so close that the excessive competition between adjacent plants reduced the yield as increased by additional number of plants. Plants with wider spacing can get more light, minerals and food nutrients, thus, closer spacing lead to great competition for moisture, light and mineral nutrients (Cortez, 1978).

Similarly, Janick (1972) stated that population pressure markedly affect plant performance. This happens because plant population increases per unit area, a point is reached at which each plant begins to compete for certain essential growth factor such as nutrients, sunlight and water. Moreover, as explained by Hill (1987) low density planting (wider spacing) promote the development of several branches which produce higher yield due to low competition pressure. However, Olive (1988) found in carrot that the number of umbels per plant and number of seed per umbel decreased with increasing plant density.

On the other hand, Maximo (1998) mentioned that wider spacing had the highest number of silique than of closer due to the fact that plants spaced at wider distances have more supply of nutrients than the closest distance due to population density and

competition between plants. The author also explained that wider spacing (45 cm) produced the highest seed yield while closer spacing (25 cm) produced the lowest yield. This maybe due to the fact that plants spaced closer increased competition for light, nutrients and moisture.

Alos (1996) found that planting the heading type of mustard at closer spacing tended to hasten maturity than a wider spacing. Plant height gradually decreased as the planting distance increased. The author also mentioned that plant spacing slightly differed in the marketable yield per plot, total yield per plot and computed yield per hectare. However, plant spacing at 20 cm x 20 cm had the heaviest yield at 23.33 kg per plant or 26.53 tons per hectare.

In radish, Rufino (1996) stated that plants with wider spacing matured earlier, produced longer and heavier individual roots and greater number of leaves.

Harvesting

Bell peppers are mature when they turn their final color. Most bell pepper fruits are green when immature and can be harvested at that time. Mature bell peppers can be red, orange, yellow, green or purple depending on the variety (Mc Collum, 1975).

Harvest bell peppers as they mature by using garden shears, clip them off the plant and do not pull them off. Continuous harvests of the bell peppers produce continuous set so they are pick off on the bushes regularly (Mc Collum, 1975).

MATERIALS AND METHODS

Materials

The materials used were Bell pepper seeds ('California Wonder'), chicken manure, 16-16-16, garden tools, insecticides and fungicides, and measuring instruments.

Methods

The experiment was conducted towards the end of the rainy season in an open field condition. The experimental design used was Randomized Complete Block Design (RCBD) with 4 replications. The treatments were as follows:

Code	Spacing (cm, between hills and rows)
S_1	30 x 30
S_2	30 x 40
S_3	40 x 40
S_4	40 x 50

An area of 80 m² was dug thoroughly and was divided into four blocks and each block was subdivided into four experimental plots measuring 1 x 5 m. Holes were made in each plot spaced in accordance with the treatments. A cup of chicken manure was applied in each hole and thoroughly mixed with the soil.

Six weeks old seedlings were transplanted. Irrigation was done regularly. Fertilizer 16 -16-16 (1½ tbps per plant) was applied four weeks after transplanting followed by hilling-up. Pests affecting the crop were controlled.

The data gathered were as follows:

1. Number of days from transplanting to flower formation. This was the number of days from transplanting to full bloom flowering.

2. Number of days from flowering to fruit set. This was the number of days from full bloom flowering to fruit set.

3. Number of days from fruit set to harvesting. This was the number of days from fruit set up to the day that the fruits were firm and dark green in color and were ready for harvest.

4. Plant height at flowering (cm). The height was taken by measuring the plant from the base to the tip at full bloom flowering. Five samples were measured in each plot.

5. Plant height at fruiting (cm). The height was taken by measuring the plant from base to the tip at fruiting. Five samples were measured in each plot.

6. Average fruit weight (g). This was taken by dividing the total weight of fruits by the total number of fruits harvested.

7. Average fruit diameter (cm). This was measured at the mid-section of five sample fruits.

8. Average fruit length (cm). This was measured from the shoulder to the tip of five sample fruits.

9. Total weight of fruits (kg/5m^2 plot). This was the total weight of fruits that were harvested from first to last harvest which included marketable and non-marketable fruits.

10. Weight of marketable fruits (kg/5m^2 plot). This was the weight of fruits from first to last harvest without defects and were sold in the market.

12. Weight of non-marketable fruits (kg/5m^2 plot). This was the weight of fruits that were discarded every harvest due to rotting, abnormalities, and very small fruits.

13. Documentation of the study. A picture of the experiment field was taken. Figure 1 shows the experimental field at fruiting stage.

Figure 1. Overview of the experimental field at fruit setting stage

RESULTS AND DISCUSSION

Number of Days From Transplanting to Flower Formation

Table 1 shows no significant differences on the number of days from transplanting to flower formation at 53 to 55 days as affected by spacing. However, it was noted that wider spacing at 40 cm x 40 cm or 40 cm x 50 cm spacing resulted to later formation of flowers from transplanting. This shows that plant spaced closer at 30 cm x 30 cm or 30 cm x 40 cm flowered earlier.

Number of Days From Flowering to Fruit Set

Significantly earlier fruit setting was observed with closer spacing particularly 30 cm x 30 cm (Table 1).

Table 1. Number of days from transplanting to flower formation, flowering to fruit set, and fruit set to harvesting

SPACING (cm)	NUMBER OF DAYS		
	Transplanting to Flower Formation	Flowering to Fruit Set	Fruit Set to Harvesting
30 x 30	53[a]	14[a]	17[a]
30 x 40	53[a]	15[b]	17[a]
40 x 40	55[a]	15[b]	18[a]
40 x 50	55[a]	16[c]	18[a]
CV (%)	5.82	4.15	7.41

Means with common letters are not significantly different at 5% level using DMRT

Number of Days From Fruit Set to Harvesting

There were no significant differences on the duration from fruit set to harvesting at 17 to 18 days as shown in Table 1.

Plant Height

No significant differences were noted on the plant height at flowering as affected by the different spacing (Table 2). However, it was observed that plants spaced wider at 40 cm x 40 cm or 40 cm x 50 cm were significantly taller at fruiting as shown in Table 2.

Average Fruit Weight

Fruits of plants provided with wider spacing at 40 cm x 40 cm or 40 cm x 50 cm had significantly heavier fruits with a mean of 60 g (Table 3).

This shows that wider spacing prevents plant competition in the use of sunlight, carbon dioxide, oxygen and absorption of water and nutrients from the soil, thus leading to the production of heavier fruits.

Table 2. Plant height at flowering and fruiting

SPACING (cm)	PLANT HEIGHT (cm)	
	Flowering	Fruiting
30 x 30	14.76[a]	16.27[c]
30 x 40	14.84[a]	17.00[b]
40 x 40	15.14[a]	18.73[a]
40 x 50	15.15[a]	18.81[a]
CV (%)	7.16	5.06

Means with common letters are not significantly different at 5% level using DMRT

Table 3. Average fruit weight, diameter, and length

SPACING (cm)	AVERAGE FRUIT WEIGHT AND SIZE		
	Weight(g)	Diameter(cm)	Length (cm)
30 x 30	39.60[c]	15.56[c]	8.89[c]
30 x 40	41.34[b]	16.84[b]	9.4[b]
40 x 40	59.78[a]	18.95[a]	11.37[a]
40 x 50	60.34[a]	19.23[a]	11.43[a]
CV (%)	1.92	3.37	4.80

Means with common letters are not significantly different at 5% level using DMRT

Average Fruit Diameter and Length

Table 3 shows that bigger fruits with a diameter of 19 cm and length of 11 cm were produced in plants spaced wider at 40 cm x 40 cm or 40 cm x 50 cm. Bonner and Galston (1959) as cited by Bilango (1996) stated that plants grown in crowded condition have smaller fruits than those grown in wider space.

Yield

Table 4 shows that significantly higher total and marketable yield and lower non-marketable yield were obtained from plants spaced 40 cm x 40 cm or 40 cm x 50 cm. This shows that wider spacing prevents plant competition to effect better yield performance of bell pepper.

Table 4. Total, marketable, and non-marketable yield

SPACING (cm)	YIELD (kg/1 m x 5 m plot)		
	Total	Marketable	Non-marketable
30 x 30	0.87[c]	0.35[c]	0.53[c]
30 x 40	0.94[b]	0.50[b]	0.44[b]
40 x 40	1.52[a]	1.42[a]	0.10[a]
40 x 50	1.52[a]	1.41[a]	0.11[a]
CV (%)	1.92	3.37	4.80

Means with common letters are not significantly different at 5% level using DMRT

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted to determine the effect of spacing on the growth and yield of bell pepper and to determine the optimum spacing for the crop.

Findings show that it took bell pepper to flower in 53 to 55 days from transplanting and that significantly shorter number of days from flowering to fruit set at 14 days was observed with closer spacing of 30 cm x 30 cm. No significant differences were noted on the number of days at 17 to 18 from fruit set to harvesting.

Plants grown with wider spacing at 40 cm x 40 cm or 40 cm x 50 cm between hills and rows were significantly taller and had significantly heavier and larger fruits and higher total and marketable yield.

Conclusion

Plant spacing greatly affected the growth and yield performance of bell pepper. Based on the results, although earlier flowering was observed in plants having closer spacing, better growth and yield were noted in plants given wider spacing.

Recommendation

It is therefore recommended that bell pepper 'California Wonder' be spaced 40 cm x 50 cm, requiring lesser amount of seeds to grow seedlings to plant a unit area, to attain better growth and higher yield of the crop.

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APPENDICES

APPENDIX TABLE 1. Number of days from transplanting to flower formation

TREATMENT	BLOCK				TOTAL	MEAN
	I	II	III	IV		
30 x 30	59	46.2	57.4	50	212.6	53.15
30 x 40	55.8	50.4	52.6	54	212.8	53.2
40 x 40	58.4	56	53	50.6	218	54.5
40 x 50	56	55.0	55.2	55	221.2	55.3
TOTAL	229.2	207.6	218.2	209.6	864.6	

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES	COMPUTED F	TABULAR F_	
					0.05	0.01
Treatment	3	13.187	4.396	0.44^{ns}	3.86	6.99
Block	3	72.628	24.209	2.46^{ns}	3.86	6.99
Error	9	89.083	9.898			
TOTAL	15	174.898				

ns – not significant Coefficient of variation = 5.82%

APPENDIX TABLE 2. Number of days from flowering to fruit set

TREATMENT	BLOCK				TOTAL	MEAN
	I	II	III	IV		
30 x 30	14	15	13	14	56	14
30 x 40	15	16	13	14	58	15
40 x 40	15	16	15	15	62	15
40 x 50	17	16	15	17	65	16
TOTAL	61	63	56	60	241	

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES	COMPUTED F	TABULAR F	
					0.05	0.01
Treatment	3	11.147	3.716	9.49**	3.86	6.99
Block	3	5.388	1.796	4.59*	3.86	6.99
Error	9	3.522	0.391			
TOTAL	15					

* – significant
** - highly significant

Coefficient of variation = 4.15%

APPENDIX TABLE 3. Number of days from fruit set to harvesting

TREATMENT	BLOCK				TOTAL	MEAN
	I	II	III	IV		
30 x 30	16	19	13	18	67	16
30 x 40	18	18	16	17	68	17
40 x 40	18	21	17	18	74	18
40 x 50	19	19	18	18	74	18
TOTAL	71	77	64	71	283	

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES	COMPUTED F	TABULAR F_ 0.05	TABULAR F_ 0.01
Treatment	3	11.125	3.708	2.17^{ns}	3.86	6.99
Block	3	26.893	8.964	5.24^{**}	3.86	6.99
Error	9	15.386	1.710			
TOTAL	15	53.404				

ns – not significant
** - highly significant

Coefficient of variation = 7.41%

APPENDIX TABLE 4. Plant height at flowering (cm)

TREATMENT	BLOCK				TOTAL	MEAN
	I	II	III	IV		
30 x 30	15	16.04	12	16	59.04	14.76
30 x 40	15.5	15.38	13.66	14.8	59.34	14.835
40 x 40	14.44	17.98	13.96	14.18	60.56	15.14
40 x 50	15.78	15.92	14.64	14.24	60.58	15.145
TOTAL	60.72	65.32	54.26	59.22	239.52	

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES	COMPUTED F	TABULAR F_ 0.05	TABULAR F_ 0.01
Treatment	3	0.487	0.162	0.14^{ns}	3.86	6.99
Block	3	15.580	5.193	4.52^{**}	3.86	6.99
Error	9	10.340	1.149			
TOTAL	15	26.407				

ns – not significant
** - highly significant

Coefficient of variation = 7.16%

APPENDIX TABLE 5. Plant height at fruiting (cm)

TREATMENT	BLOCK				TOTAL	MEAN
	I	II	III	IV		
30 x 30	16	18	13.92	17.14	65.06	16.265
30 x 40	17.8	17.64	15.98	16.58	68	17
40 x 40	18.08	21.46	17.8	17.58	74.92	18.73
40 x 50	19.18	19.8	17.64	18.6	75.22	18.805
TOTAL	71.06	76.9	65.34	69.9	283.2	

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES	COMPUTED F	TABULAR F_ 0.05	TABULAR F_ 0.01
Treatment	3	19.325	6.442	8.02**	3.86	6.99
Block	3	16.975	5.658	7.04**	3.86	6.99
Error	9	7.229	0.803			
TOTAL	15	43.529				

** - highly significant Coefficient of variation = 5.06%

APPENDIX TABLE 6. Average fruit weight (g)

TREATMENT	BLOCK				TOTAL	MEAN
	I	II	III	IV		
30 x 30	39.56	38.63	38.94	41.25	158.38	39.60
30 x 40	41.25	42.38	40.53	40.90	165.36	41.34
40 x 40	59.04	59.09	59.52	61.48	239.13	59.78
40 x 50	60.00	59.50	61.42	60.47	241.38	60.35
TOTAL	199.85	199.60	200.41	204.10	804.25	

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES	COMPUTED F	TABULAR F_	
					0.05	0.01
Treatment	3	1542.976	514.325	551.75**	3.86	6.99
Block	3	3.240	1.080	1.16ns	3.86	6.99
Error	9	8.390	0.932			
TOTAL	15	1554.606				

ns – not significant
** - highly significant

Coefficient of variation = 1.92%

APPENDIX TABLE 7. Average fruit diameter (cm)

TREATMENT	BLOCK				TOTAL	MEAN
	I	II	III	IV		
30 x 30	16.00	16.04	15.00	15.20	62.24	15.56
30 x 40	17.00	17.00	16.14	17.20	67.34	16.84
40 x 40	18.60	19.20	18.00	20.00	75.80	18.95
40 x 50	18.40	20.40	19.10	19.00	76.90	19.22
TOTAL	70.00	72.64	68.24	71.40	282.28	

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES	COMPUTED F	TABULAR F_ 0.05	TABULAR F_ 0.01
Treatment	3	36.811	12.270	34.80**	3.86	6.99
Block	3	2.682	0.894	2.54ns	3.86	6.99
Error	9	3.174	0.353			
TOTAL	15	42.666				

ns – not significant
**-highly significant

Coefficient of variation = 3.37%

APPENDIX TABLE 8. Average fruit length (cm)

TREATMENT	BLOCK				TOTAL	MEAN
	I	II	III	IV		
30 x 30	9.06	10.00	8.50	8.00	35.56	8.89
30 x 40	10.00	9.40	9.00	9.20	37.60	9.40
40 x 40	11.00	12.00	11.20	11.26	45.46	11.37
40 x 50	11.00	11.90	11.00	11.80	45.70	11.43
TOTAL	41.06	43.30	39.70	40.26	164.32	

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES	COMPUTED F	TABULAR F_ 0.05	TABULAR F_ 0.01
Treatment	3	20.777	6.926	28.45^{**}	3.86	6.99
Block	3	1.876	0.625	2.57^{ns}	3.86	6.99
Error	9	2.191	0.243			
TOTAL	15	24.845				

ns – not significant
** - highly significant

Coefficient of variation = 4.80%

APPENDIX TABLE 9. Total weight of fruits (kg/5m^2 plot)

TREATMENT	BLOCK				TOTAL	MEAN
	I	II	III	IV		
30 x 30	0.97	0.85	0.74	0.99	3.49	0.87
30 x 40	0.99	0.89	0.98	0.90	3.76	0.94
40 x 40	1.54	1.50	1.55	1.49	6.08	1.52
40 x 50	1.62	1.39	1.59	1.47	6.07	1.52
TOTAL	5.12	4.63	4.86	4.85	19.46	

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES	COMPUTED F	TABULAR F_	
					0.05	0.01
Treatment	3	1.470	0.490	79.547**	3.86	6.99
Block	3	0.030	0.010	1.631ns	3.86	6.99
Error	9	0.055	0.006			
TOTAL	15	1.555				

ns – not significant
** - highly significant

Coefficient of variation = 6.45%

APPENDIX TABLE 10. Weight of marketable fruits (kg/5m^2 plot)

TREATMENT	BLOCK				TOTAL	MEAN
	I	II	III	IV		
30 x 30	0.29	0.35	0.30	0.45	1.39	0.35
30 x 40	0.53	0.49	0.48	0.50	2.00	0.50
40 x 40	1.38	1.50	1.55	1.25	5.68	1.42
40 x 50	1.42	1.39	1.39	1.42	5.62	1.41
TOTAL	3.62	3.73	3.72	3.62	14.69	

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES	COMPUTED F	TABULAR F_ 0.05	TABULAR F_ 0.01
Treatment	3	3.957	1.319	171.057**	3.86	6.99
Block	3	0.003	0.001	0.120ns	3.86	6.99
Error	9	0.069	0.008			
TOTAL	15	4.030				

ns – not significant Coefficient of variation = 9.56%

APPENDIX TABLE 11. Weight of non-marketable fruits (kg/5m^2 plot)

TREATMENT	BLOCK				TOTAL	MEAN
	I	II	III	IV		
30 x 30	0.62	0.50	0.44	0.54	2.10	0.53
30 x 40	0.46	0.40	0.50	0.40	1.76	0.44
40 x 40	0.16	0.00	0.00	0.24	0.40	0.10
40 x 50	0.20	0.00	0.20	0.05	0.45	0.11
TOTAL	1.44	0.90	1.14	1.23	4.71	

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARES	COMPUTED F	TABULAR F_ 0.05	TABULAR F_ 0.01
Treatment	3	0.581	0.194	28.179**	3.86	6.99
Block	3	0.038	0.013	1.820ns	3.86	6.99
Error	9	0.062	0.007			
TOTAL	15	0.680				

ns – not significant
** - highly significant

Coefficient of variation = 28.16