Comparative Performance of Bulb and Multiplier Onions *(Allium cepa)* Under Two Methods of Culture

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Abstract

Experimental study was conducted from January 2009 to April 2009 in Naglaoa – an, Sto. Domingo, Ilocos Sur. It aimed to determine the comparative performance of bulb and multiplier onions under two methods of culture and to determine which of the two onion varieties produce the highest yield under two methods of culture.

This study had two variety trials and methods of culture replicated six times and it was laid out using the Split Plot Design (SPD) having two plot sizes, the main plot and the sub plot: Variety 1 – multiplier onion, Variety 2 – bulb onion as the main plot while Method of Culture 1 – mulched, Method of Culture 2-- furrow as the subplot.

Based on the kind on variety of onions harvested, there were significant differences on the initial height. Multiplier onions (O1) exhibited the tallest initial height with a mean of 14.97 cm and bulb onions (O2) got a mean of 12.80 cm.

On the average final height of onion plants, significant differences were also observed. Treatment combination of O2C1 (bulb, with mulch) produced the tallest final height with a mean of 26.63 cm and the least was O1C2 (multiplier, furrow) with a mean of 22.43 cm.

As to the average number of bulbs per plot, treatment combination of O1C1 (multiplier, with mulch) registered the most number of bulbs produced per plot with a mean of 69.67 followed by O2C2 (bulb, furrow), O1C2 (multiplier, furrow) and O2C1 (bulb, with mulch) with means of 54.33, 43.33 and 37.00 bulbs per plot, respectively.

In the computed net income per plot and per hectare, treatment combination O1CI (multiplier with mulch) produced the highest with Php20,833.30 per hectare. The lowest was produced in O2CI (bulb with mulch) with a computed net income of Php7,870.30. This was expected because of the very high inputs especially in the cost of bulbs as planting material and rice hay for mulching material.

Introduction

Background of the Study

Onion (*Allium cepa*), with its limited root system gives maximum productivity if good cultural practices are employed during its growth and reproductive stages.

Usually, fanners grow onions during the month of October up to summer time. Crop in relation to any limiting factor of the environment, cannot perfonn well and give the maximum returns. But by identifying varieties tolerant today, length and temperature may greatly influences the quality and supply of the crop the whole year round.

The tradition of mulching the field for planting onions is practiced by some fanners. The most commonly used for mulch is rice straw or hay which conveniently serves the purpose of preventing rapid evaporation of moisture while serving as fertilizer as well. As the straw dries after each watering of the garden plot in which it is laid, it *rots* and becomes organic foods added to the soil.

On the other hand, furrow method of planting is also practiced during dry weather. This method reduces the labor supply needed, but increases the volume of water needed by the plants.

Objectives of the Study

1. To determine the comparative performance of bulb and multiplier onions under two methods of culture.
2. To detennine which of the two onion varieties produce the highest yield under two methods of culture.

Methodology

1. Land preparation

An experimental area of 450 sq m was thoroughly prepared by plowing 3 times and each plowing was followed by harrowing to eradicate the weeds and to pulverize well the soil clods.

After land preparation the area was divided into 3 blocks or replication making use of Split Plot Design (SPD). Each block was divided into 2 main plots where the 2 kinds of onion (bulb and multiplier) were planted.

2. Planting

In the furrow method of culture (C2), 3 furrows were made on each plot while on the mulched (C1), rice hay was spread at 2 in thick above each plot. One bulb was planted per hill and the distance of planting was 30 cm between hills and 30 cm between rows.

3. Fertilization

First application of chicken manure at the rate of 4 kg per plot was drilled a day before planting to have a stored nutrients for the assimilation of bulbs. The second application of chicken manure was applied at the same rate at bulbing stage which was 4 weeks after planting.

4. Irrigation

Watering was administered just after planting to lessen excessive heat and induce sprouting. Irrigation was done at weekly intervals.

5. Cultivation and weeding

Shallow cultivation and weeding were also done to facilitate the growth of onion plants. All approved cultural practices were followed constantly throughout the treatments.

6. Harvesting

Harvesting was done by gathering the onion plants when they were already fully matured.

7. *Gathering of data*

a. Initial height of onion plants. The average initial height of onion plants was taken 1 mo after planting. Twenty (20) sample plants were taken at random in the inner rows then measured from the base of the plants to the tip of the largest leaf in terms of cm.

b. Final height of onion plants. The final height of onion plants at maturity was taken a day before harvesting.

c. Average number of bulbs per plot. The average number of bulbs produced per plot was counted.

d. Average yield per plot. The average yield per plot in kg was taken by weighing the production from the sample onion plants taken from each treatment.

e. Computed yield per hectare. The computed yield per hectare in kg was computed by subtracting the inputs from the outputs.

Review of Related Literature

Barrera (1996) reported that mulching helps in keeping the surface of the soil cool as well as in controlling the evaporation of moisture and the growth of weeds.

Besumont (1997) stated that applying mulches had definite advantages. It checks the evaporation of soil moisture and reduces soil erosion. In addition, organic mulches encourage the presence of earthworms and if worked into the soil, provide organic matter.

Canosa, and Carasi, (2006) found out that taller plants were obtained in mulched plots but greater yields were obtained in furrow method of planting. They reported that more bulbs were produced in furrow method but bigger sizes of bulbs were obtained in flatbed method with mulch.

Estrada (2006) reported that plants mulched with rice straw and banana leaves exhibited faster rate of growth and greater number of developed bulbs than those mulched with cogon, talahib, sawdust, and rice hull. The former two mulching materials provide good aeration and better retentivity of the soil.

Racca (2004) found out that furrow method of planting onion out yielded the mulched and unmulched plots, respectively.

Discussion of Results

Growth and Yield Characteristics of Bulb and Multiplier Onion Performance of Variety

A significant variation was noted on initial height, number of bulbs per plant, and yield in kilograms per plot and per hectare of *Batanes* and *Australian* varieties of onion but no differences noted on the final height.

Table 1. Growth and Yield Characteristics of Bulb and Multiplier Onion

Treatment	Initial Ht cm)	Final Ht (cm)	No. of Bulbs	Yield	
Mainplot				ke!1o)	kg/ha)
O1	14.97 a	24.90 a	69.67 **a**	8.42 a	1,039.51 a
O2	12.80 b	22.43 a	43.33 b	6.38 b	787.63 b
Significance	**	Ns	##	#¥	#¢
CV (a) 38.28%	**CV(0) 7.4%**				

As regards to initial height, *Batanes* variety was significantly taller (14.97 cm) than *Australian* variety (12.80 cm).

With respect to number of bulbs per plant, *Batanes* variety significantly produced more number of bulbs per plant (69.67) than *Australian* variety (43.33).

As to the yield, *Batanes* significantly outyielded *Australian* variety with a mean of 8.42 kg/plot or I, 039.51 kg/ha.

Effects of Methods of Planting

The initial height, final height, number of bulbs/plant and yield of onions as affected by methods of planting showed highly significant variation.

As to the initial height, mulching the onion plants were significantly obtained taller (18.82 cm) than onions planted in furrows (13.05 cm)

As to the number of bulbs per plant, treatment combination of multiplier onions with mulched (OIC1) produced the most number of bulbs per plant (69.67 bulbs) than bulb onions with mulched (O2CI) having 37.00 bulbs per plant.

Table 2. Effects of Methods of Planting.

Treatment	Initial Ht (cm)	Final Ht (cm)	No. of Bulbs	Yield	
				kg/plo).	(kglha)
CI Mulch)	18.82 a	26.63 a	37.00 b	9.00 a	I, 111.11 a
C2 (Furrow)	13.05 b	23.52 b	54.33 a	7.38b	911.11 b
Significant	##	##¥	¥	¥#	#¥

CV (a) 25.55% **CV(b) 8.43%**

With regard to yield, onion with mulch produced the highest with a mean of 9.00 kg/plot on l, 111.11 kg/ha. This was due to lesser weed growth as one of the competitors in the production of onion plants.

Interaction Effects

Treatment combination of OlCl (multiplier onion with mulched) registered the most number of bulbs produced per plot with a mean of 69.67 bulbs, followed by O2C2 (bulb onions planted in furrow) with means of 54.33, 43.33 and 37.00 bulb per plot respectively.

Table 3. Table of Interaction (OxC) Variety and Culture on the Average Bulbs per Plot

Treatments	Mean
Variety_x Culture	
O1C1	69.67 a
O1c2	43.33 b
O2Cl	37.00 b
O2C2	54.33
Significance ¥#	

CV(a)17.36% CV (b) 11.13%

Significant difference was observed between the two kinds of onions used as primary variable and as the methods of culture employed. Results implied that there was a significant difference on the perfonnance of the kinds of onions as to the average number of bulbs produced per plot. This was expected because OI is multiplier, while O2 is bulb in nature; hence, a significant was noted between the two.

Table 4. Economic Analysis of Bulb and Multiplier Onions

Variety	Yield/plot (kg)	Yield/ha (kg)	Gross Sale Phpha)	Production Cost Phpha]	Net Income Phpha)	Return of Investment M)
Batanes	8.42	1, 039.51	31, 185.30	12,500	18,685.30	59.92
Australian	*6.38*	787.65	23. 629.50	12,500	11, 129.50	47.10
Culture						
Mulch	9.00	1,111.11	33,333.30	12,500	20,833.30	62.50
Furrow	7.38	911.11	27,333.30	12,500	14,833.30	54.27
OXC						
O1c1	9.00	1,111.11	33, 333.30	12,500	20,833.30	62.50
O1C2	5.75	709.88	21,296.40	12,500	8, 796.40	41.30
O2C1	5.50	679.01	20,370.30	12,500	7,870.30	38.64
O2c2	6.50	802.47	24,074.10	12,500	11,574.10	48.08

Dried onions sold @ Pbp 30/k

On the computed net income per plot and per hectare, treatment combination OlCl (multiplier with mulched) produced the highest with Php 20, 833.30 per hectare. The lowest was produced in O2Cl (bulb, mulched) with a computed net income of Php 7, 870.30. This was expected because of very high inputs especially in the cost of bulbs as planting material and rice hay as mulching material.

Conclusions

I. The growth perfonnance of the kinds of onions was influenced by any of the methods of culture used during the growth and development of the onion plants.

2. Multiplier onions produced significantly more bulbs than the onion bulb.

3. The two kinds of onion differed significantly on the yield per plot with multiplier onion outyielding the bulb onion.

4. Multiplier onions grown with mulch produced the highest computed net return because it gave the highest yield.

Recommendations

I. Any of the two kinds of onions could be grown with mulch or in furrow.

2. Multiplier onions should be grown in the field either with mulch or in furrow so as to produce more bulbs and highest yield per plot and per hectare.

3. A study using seeds of multiplier and bulb onions as planting materials with closer distance such as 15x15 or 20x20 cm should be conducted in order to obtain higher yield **per area** cultivated.

4. Follow'– up study is further recommended using other types of mulching materials as to have a concrete basis in recommending the results to the onion growers.

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