BIBLIOGRAPHY

DOGYANG, CLEJE AIL B. MAY 2013. Organic Production Practices for Chrysanthemum (*Chrysanthemm morifolium)* Cutflower Production. Benguet State University, La Trinidad Benguet.

Adviser: Araceli G. Ladilad, PhD.

ABSTRACT

The study was conducted to determine appropriate and suitable organic production practices for the production of quality chrysanthemum cutflower; establish a pre-production/production and postharvest management systems in the organic production of chrysanthemum cut flower; and determine the economics of using the different organic production practices in chrysanthemum cut flower production, using three common varieties grown for cut flower production under La Trinidad Benguet condition. The study was conducted at the BSU Ornamental Horticulture Research Area, La Trinidad Benguet from December 2012 to March 2013.

Results of the study showed that variety 'Pink tube' and variety 'Handsome' were the best performing chrysanthemum varieties tested for organic chrysanthemum cutflower production since both produced more number of leaves, the earliest to produce 0.5 cm flower buds and earliest to reach harvesting stage. Variety 'Handsome' produced bigger flowers and high cutflower yield that gave the highest return on cash expenses of 60.62 %, while 'Novo' gave the lowest cutflower quality and the lowest return on cash expenses of 0.60 % among the three varieties grown.

The use of sunflower-based production practice promoted the production of more number of leaves per plant; earliest to attain 0.5 cm flower bud size, while mukusako-based production practices promoted the production of bigger flowers.

Based on the findings variety ‘Handsome’ applied with mukusako-based production practices is recommended for organic chrysanthemum cutflower production since it produced thicker stems, bigger flowers and had high ROCE of 60.62%

RESULTS AND DISCUSSION

Vegetative Growth

Final Height at Flowering

Effect of variety. The final height of the three varieties of chrysanthemum used is shown in Table 1. Significantly taller plants were measured from "Handsome" with a mean of 86.41 cm while "Pink tube" had a mean height of 70.94 cm which was the shortest among the three varieties grown.

Sagalla (2000) pointed that each plant species had a unique genetic make-up. It determines the yield potential, relative susceptibility to unfavorable environment, earliness and regularity of bearing, length of productive life, and size and shape of plants at maturity. She further stated that the internal factor sets the boundaries in which improvement of yield or quality can be altered by manipulation of environmental factors.

Table 1. Final height at flowering

TREATMENT	HEIGHT AT FLOWERING (cm)
Variety	
Pink Tube	70.94[c]
Novo	76.36[b]
Handsome	86.41[a]
Production Practice	
Farmers' practice	79.03
Mukusako-based	76.15
Sunflower-based	79.20
Nature's Crop	77.23

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

Effect of production practice. Results showed that there were no significant differences on the final height at flowering as influenced by the different production practice. But numerically, farmer's practice has the tallest final height at flowering.

Interaction effects. There were no significant interaction effects observed between the different chrysanthemum varieties and the different production practices on the final height of chrysanthemum at flowering.

Leaf Number at Flowering (50% anthesis)

Effect of variety. The influence of the three varieties on the number of leaves per plant at harvest is shown in Table 2. Highly significant differences were obtained among the varieties evaluated. "Handsome" and "Pink Tube" significantly produced more leaves with a comparable means of 36.73 and 35.34 leaves per plant; respectively while "Novo" had significantly lower number of leaves with a mean of only 28.47 leaves per plant.

Mc Vikar (1970) reported that fertilizer applied as foliar spray to the leaves was needed quickly to overcome some particular mineral deficiency which if allowed going uncorrected would seriously impair the yield of plants and number of leaves.

Effect of production practice. Significant differences were obtained on the number of leaves per plant at flowering (50% anthesis) as shown in Table 2. Chrysanthemum plants applied with sunflower-based production practices produced more leaves with a mean of 35.74 leaves per plant, while the least number of leaves were observed from plants applied with mukusako-based production practice and with the use of use Nature's Crop organic production practice.

Table 2 Leaf number at flowering

TREATMENT	NUMBER OF LEAF AT FLOWERING
Variety	
Pink Tube	35.34[a]
Novo	28.47[b]
Handsome	36.73[a]
Production Practice	
Farmers' practice	33.63[ab]
Mukusako-based	32.17[b]
Sunflower-based	35.74[a]
Nature's Crop	32.51[b]

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

Interaction effect. There were significant interaction effects between the three varieties and production practice on the number of leaves counted per plant at flowering. Among the three varieties, however, "Handsome" and "Pink Tube" produced the highest number of leaves/plant with means of 84.41 and 70. 94, while the lowest numbers of leaves were counted from "Novo" treated with Nature's Crop production practice with a mean of 32.51.

Stem Thickness at Harvest, (6 cm above the ground)

Effect of variety. Highly significant differences were observed on the measured stem diameter of cutflowers from the different varieties evaluated (Table 3). "Handsome" had wider stem diameter with a mean of 0.55 cm

This result can be explained by Janick (1972) who stated that climate, the summation of the weather condition in an area, which involves moisture and light effects; are the factors to be considered in the physical environment of the plant. These determines when, where and what plants will grow.

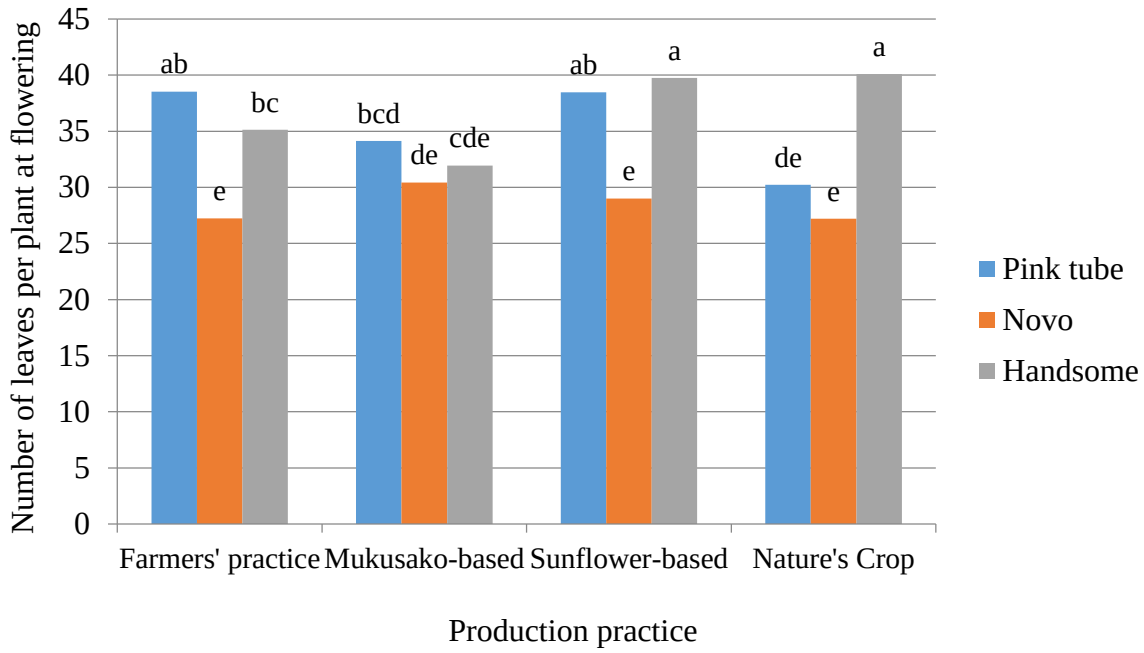

Fig.1 Number of leaver per plant at flowering as affected by variety and different production practices (Means with a common letter are not significantly different at 5% level by DMRT)

Table 3. Stem thickness at harvest, (6 cm above the ground)

TREATMENT	STEM THICKNESS AT HARVEST (cm)
Variety	
Pink Tube	0.49[b]
Novo	0.46[b]
Handsome	0.55[a]
Production Practice	
Farmers' practice	0.48
Mukusako-based	0.52
Sunflower-based	0.51
Nature's Crop	0.50

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

Effect of production practice. There were no significant effects observed in the different production practices applied on chrysanthemum cutflower production. However,

numerical data showed that plants applied with mukusako-based production practice has the biggest stem diameter compared to the other production practices applied.

Interaction effect. There were no significant interaction effects noted between the different varieties of chrysanthemum and different production practice applied.

Reproductive Growth

Days from Transplanting to 0.5 cm Flower Bud Size

Effect of variety. Statistical analysis shows that there were highly significant differences obtained on the effect of the different varieties on the number of days from transplanting to 0.5 cm flower bud size stage (Table 4). Results show that "Novo" had the longest duration to form flower buds with a mean of 61.79 days from transplanting of

Table 4. Days from transplanting to 0.5 cm flower bud size

TREATMENT	DAYS FROM TRANSPLANTING TO 0.5 CM FLOWER BUD SIZE
Variety	
Pink Tube	56.27[c]
Novo	61.79[a]
Handsome	60.12[b]
Production Practice	
Farmers' practice	58.76[c]
Mukusako-based	59.46[b]
Sunflower-based	60.08[a]
Nature's Crop	59.28[bc]

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

rooted cuttings while “Pink Tube” flowered after a mean of 56.27 days from transplanting and had the fastest duration to form flower buds observed.

Effect of production practice. Results show that there were highly significant effects of the different production practices on the flowering of chrysanthemum. Plants that were applied with farmers’ practice were the earliest to attain 0.5 cm flower bud size from transplanting with a mean of 58.76 days (Table 4). Application of sunflower-based production practices significantly delayed flowering with flower buds at 0.5 cm after a mean of 60.08 days from transplanting.

Interaction effect. Significant interaction effects were obtained between the three varieties of chrysanthemum and different production practices on the duration of transplanting to 0.5 cm bud size. “Novo” applied with the farmer’s practice, mukusako practices; and the Nature’s Crops practices were the latest to attain 0.5 cm flower bud size from transplanting with a mean of 62.13, 62.11 and 61.60 days; respectively;

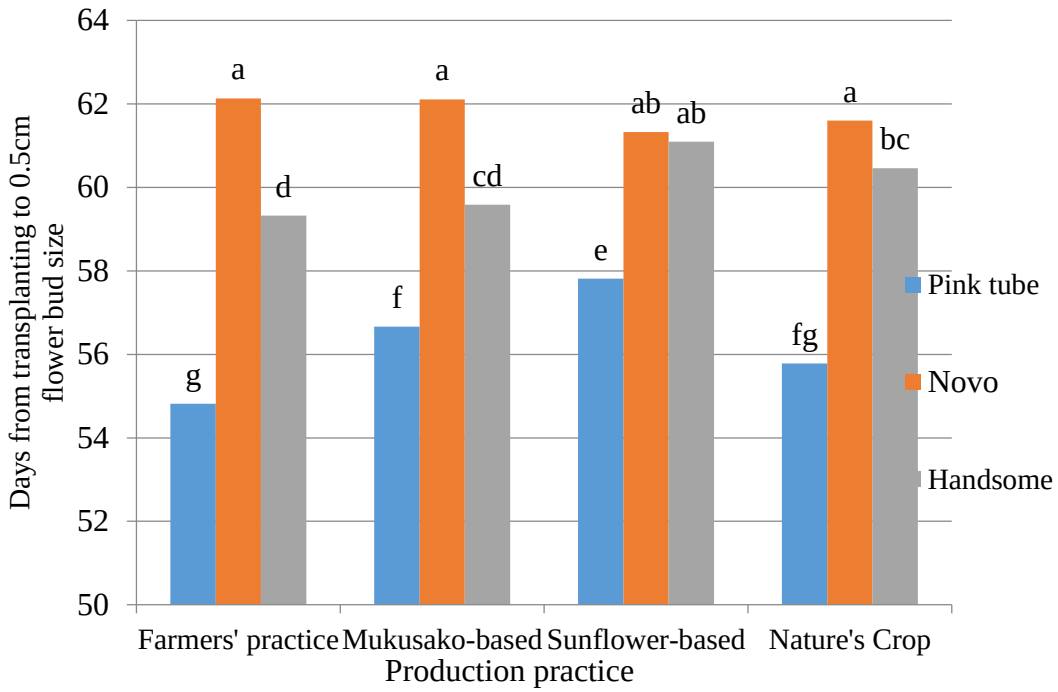

Fig. 2 Days from transplanting to 0.5 cm flower bud size as affected by variety and different production practices (Means with a common letter are not significantly different at 5% level by DMRT)

while "Pink Tube" applied with farmer's practice and Nature's Crop products were the earliest to form 0.5cm bud size with means of 54.82 and 55.78 days from transplanting.

Days from Flower Bud Formation to Harvesting Stage (3 first flower at 50% anthesis)

Effect of variety. Table 5 shows the number of days from 0.5 cm flower bud stage to harvesting stage of the three varieties of chrysanthemum grown. "Novo" had delayed flower development reaching harvestable stage with a mean of 19.96 days from 0.5 cm bud size; which was significantly longer compared to the other varieties grown. "Pink Tube" was the earliest to reach 50% anthesis with a mean of only 14.50 days.

Effect of production practice. Highly significant differences were likewise, obtained on the effects of the different production practices used in the number of days from 0.5 cm bud size to harvesting stage as shown in Table 5.

Table 5. Days from flower bud formation to harvesting stage (3 first flowers at 50% anthesis)

TREATMENT	DAYS FROM FLOWER BUD FORMATION TO HARVESTING STAGE
Variety	
Pink Tube	**14.50^{c}**
Novo	**19.96^{a}**
Handsome	**15.85^{b}**
Production Practice	
Farmers' practice	**17.16^{a}**
Mukusako-based	**16.42^{b}**
Sunflower-based	**16.80^{ab}**
Nature's Crop	**16.70^{b}**

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

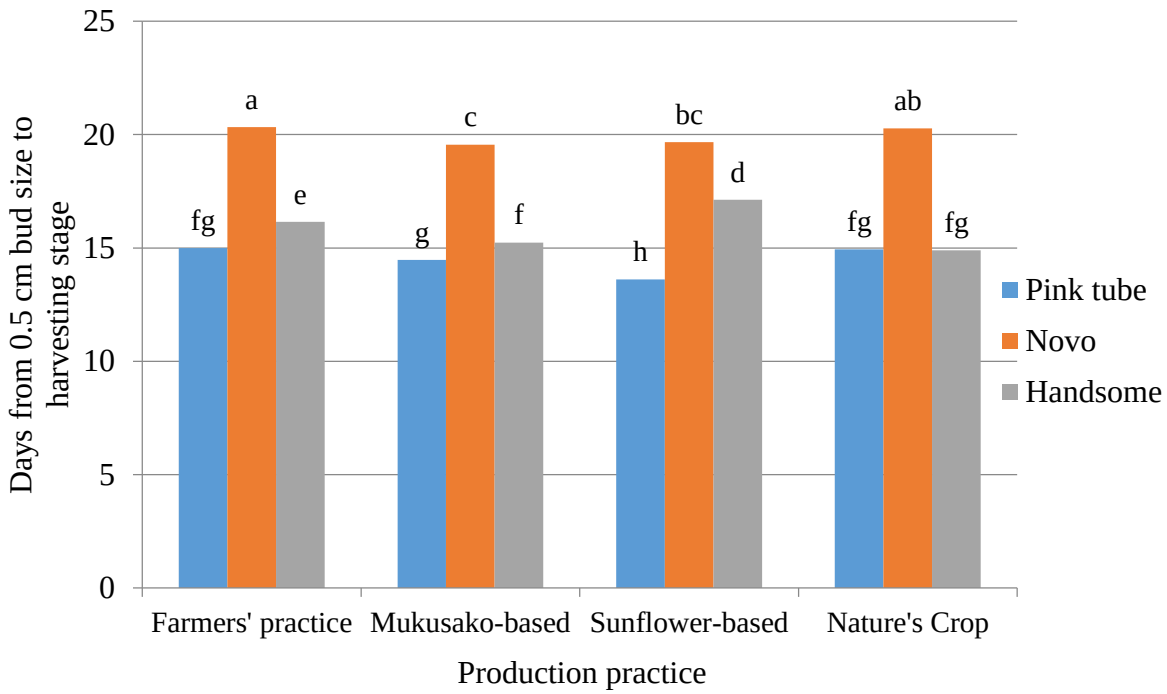

Fig. 3 Days from 0.5 cm bud size to harvesting stage as affected by variety and different production practices (Means with a common letter are not significantly different at 5% level by DMRT)

Plants applied with mukusako-based production practices and Nature's Crop practices were observed to have the shortest period of flower development with means of 16.42 and 16.70 days from 0.5 cm bud formation to harvesting stage. The longest to reach harvesting stage were the plants applied with the farmers' practice with a mean of 17.16 days from 0.5 cm bud size to harvesting stage.

Interaction effect. There were highly significant interaction effects between the three varieties and the different production practices on the number of days from 0.5 cm bud size to harvesting stage. "Novo" applied with farmers' practice and nature's crop were the latest to attain 0.5 cm bud size to harvesting stage with means of 20.33 and 20.28 days; respectively from 0.5 cm flower bud size.

Cutflower Stem Length at Harvest

Effect of variety. Highly significant differences were obtained on the effect of different varieties grown on the cutflower stem length at harvest as shown in Table 6. "Handsome" produced the longest cutflower stems with a mean of 83.74 cm compared to the other varieties grown which had stems ranging from 67.18 to 73.27 cm; at harvest.

Effect of production practice. There were no significant interaction effects noted between the different production practices. However, results showed that plants applied with farmers' practice had the longest stems at harvest.

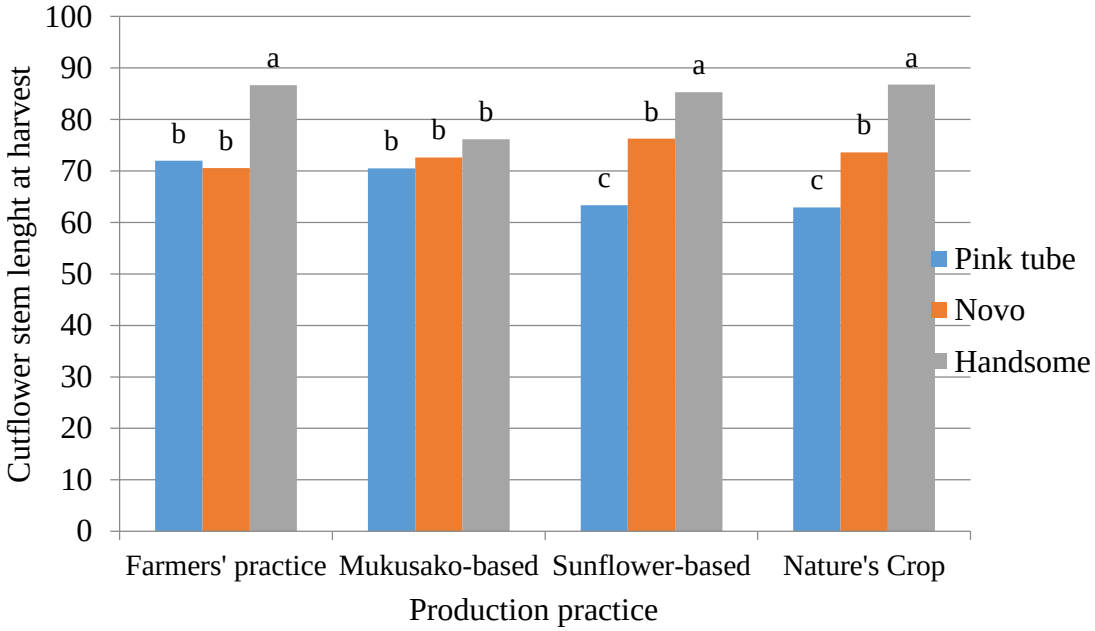

Fig. 4 Cutflower stem length at harvest as affected by variety and different production practices (Means with a common letter are not significantly different at 5% level by DMRT)

Table 6. Cutflower stem length at harvest

TREATMENT	CUT FLOWER STEM LENGTH AT HARVEST	CUTFLOWER GRADE
Variety		
Pink Tube	**67.18[c]**	**Class B**
Novo	**73.27[b]**	**Class A (short)**
Handsome	**83.74[a]**	**Class A (Medium)**
Production Practice		
Farmers' practices	**76.40**	**Class A (short)**
Mukusako-based	**73.10**	**Class A (short)**
Sunflower-based	**74.97**	**Class A (short)**
Nature's Crop	**74.43**	**Class A (short)**

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

Interaction effect. There were no significant interaction effects noted between the different varieties of chrysanthemum and the different production practices on the stem length of cutflowers at harvest.

Size of Flower

Effect of variety. Highly significant differences on the flower size were obtained from the three varieties of chrysanthemum at harvesting stage (Table 7). "Handsome" produced the biggest flowers with a mean of 2.67 cm across compared to the other varieties which had flower sizes ranging from 2.60 and 2.58 cm.

The results show that flower diameter is affected by its flower type basing from each description inherently passed through from generation to generation and according to Marshall and Sagar (1976), the extent to which plant parts were supplied with assimilates is directly related to their rate of growth or sugar storage capability. Larger blooms could be attributed to a more times at which the assimilates are translocated to the developing flower blooms.

Table 7. Flower diameter at 50% anthesis

TREATMENT	FLOWER DIAMETER AT 50%ANTHESIS (cm)
Variety	
Pink Tube	**2.30[b]**
Novo	**2.58[b]**
Handsome	**2.67[a]**
Production Practice	
Farmers' practice	**2.67[b]**
Mukusako-based	**2.76[a]**
Sunflower-based	**2.57[c]**
Nature's Crop	**2.47[d]**

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

Effect of production practice. Highly significant differences on the flower size as affected by the different production practices were noted. Plants applied with mukusako-based technology with a mean of 2.76 cm had the biggest blooms, while the smallest flower sizes were obtained from plants applied Nature's Crop practices.

Interaction effect. Highly significant differences were obtained on the effect of the three chrysanthemum varieties and the different production practices. "Novo" applied with mukusako-based technology had the biggest flower sizes at 50% anthesis with a mean of 2.98 cm accross.

Soil Analysis

Table 8 shows the results of the initial and final soil analysis obtained at transplanting of seedlings and after the cutflowers were harvest. Soil pH was decreased using the farmers' practice, mukusako-based and sunflower-based production practices, while the soil pH

increased with the used of Nature's Crop production practices. Application of Nature's Crop and mukusako-based production practices had the highest

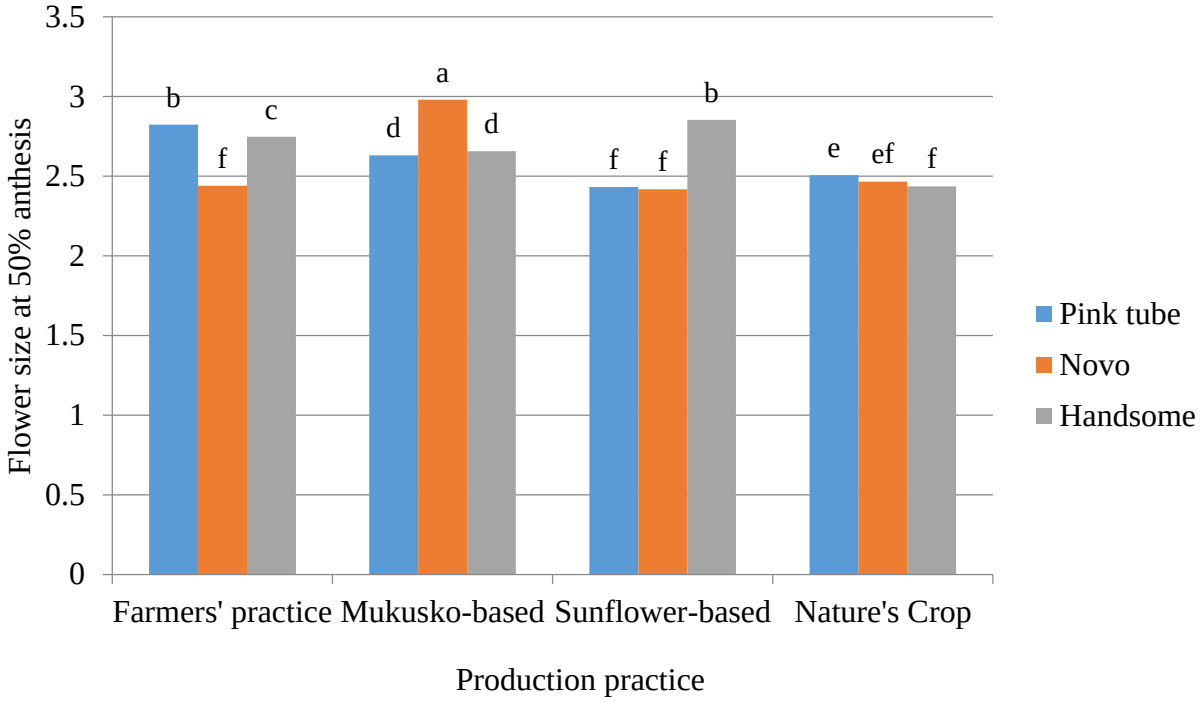

Fig. 5 Flower size at 50% anthesis as affected by variety and different production practices (Means with a common letter are not significantly different at 5% level by DMRT)

Table 8. Soil analysis at transplanting and after cutflowers were harvested

TREATMENT	pH	OM (%)	P_2O_5 P, ppm	K_2O K, ppm
Initial soil analysis at transplanting	6.8	Low	High	Slightly sufficient
Soil analysis after cutflowers were harvested				
Farmers' Practice	6.10	3.5	330	2,400
Mukusako-based	6.54	4.0	200	1,100
Sunflower-based	6.64	3.0	270	916
Nature's Crop	6.88	4.5	200	960

percentage of organic matter of 4.5% and 4.0%; respectively; while the application of the farmers' practice had the highest P and K, ppm of 330 and 2,400.

Occurrence of Insect Pests and Disease

Insect pests and disease during the study were identified. The insect pest noted during the study as the aphids and which was controlled by using strong water pressure mixed with detergent powder; while the disease observed was white rust which was controlled by watering the plants early in the morning. For farmer's practice, the aphids and white rust were controlled by spraying insecticides and fungicides.

Table 9. Occurrence of insect pests and disease

INSECT PEST	STAGE OF PLANT GROWTH	DEGREE OF INFESTATION
Aphids	Vegetative stage	No infestation
	Reproductive stage	Slight infestation
	Harvesting stage	Slight infestation
DISEASES	**STAGE OF INFESTATION**	**DEGREE OF INFESTATION**
White rust	Vegetative stage	No infestation
	Reproductive stage	Slight infestation
	Harvesting stage	Moderate infestation

Meteorological Data

The minimum and maximum air temperature during the study period ranged from 23.7 to 26.3 ^{0}C and 12.3 to 16.9 ^{0}C, respectively while relative humidity ranged from 80.11% to 83.25 % (Table 10). Sunshine duration in the month of January, March and April was low ranging from 5.0766 to 6.2083 hours, while the rainfall ranges from 00001 to 0042.5 mm (Table 10).

Table 10. Meteorological data for the cropping period

MONTHS	TEMPERATURE (^{O}C) MAXIMUM	MINIMUM	RELATIVE HUMIDITY (%)	RAINFALL (mm)	SUNSHINE DURATION (hours)
December	24.2	14.5	80.61	00001	6.295
January	23.7	12.3	80.45	00005	6.0
February	24.3	13.7	80.11	00001	6.3283
March	25.5	16.9	83.16	00025	5.0766
April	26.3	16.32	83.25	0046.5	6.2083

Marketable Cutflowers per Plot(doz)

Effect of variety. Table 10 shows the cutflower yield from the three varieties of chrysanthemum grown. Results show that “Handsome” and “Pink tube” had significantly higher yield with means of 5.11 and 4.98 (doz/plot) while “Novo” had the lowest yield with a mean of 4.84 (doz/plot).

These results can be explained Sagalla (2000) pointed that each plant species had a unique genetic make-up. It determines the yield potential, relative susceptibility to unfavorable environment, earliness and regularity of bearing, length of productive life, and size and shape of plants at maturity. She further stated that the internal factor sets the boundaries in which improvement of yield or quality can be altered by manipulation of environmental factors.

Table 11. Marketable yield/plot (doz. /m^2)

TREATMENT	MARKETABLE YIELD (doz./m^2)
Variety	
Pink Tube	**4.98^{ab}**
Novo	**4.84^{b}**
Handsome	**5.11^{a}**
Production Practice	
Farmers' practice	**5.14**
Mukusako-based	**4.87**
Sunflower-based	**4.95**
Nature's Crop	**4.94**

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

Effect of production practice. There were no significant effects observed on the number of marketable cutflower as affected by different production practices applied on chrysanthemum as shown in Table 10. Results show that, plants applied with farmers' practice produced the highest marketable cutflowers yield of 5.14 dozens per 1x2.5 cm plot.

Interaction effect. There were no significant interaction effects observed between the different varieties of chrysanthemum and the production practices applied.

Non-Marketable Cutflower per Plot(doz.)

Effect of variety. There were no significant effects of variety on the non-marketable yield per 1x2.5 cm plot. However, "Novo" has the highest volume of non-marketable cutflowers among the three varieties grown.

Table 12. Non-marketable yield/plot (doz. /m^2)

TREATMENT	NON-MARKETABLE YIELD (doz./m^2)
Variety	
Pink Tube	**0.40**
Novo	**0.55**
Handsome	**0.31**
Production Practice	
Farmers' practice	**0.24**
Mukusako-based	**0.55**
Sunflower-based	**0.43**
Nature's Crop	**0.47**

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

Effect of production practices. There were no significant effects of the different production practices on the non-marketable yield per 1x2.5 cm plot. However, plants that were applied with mukusako have the highest non-marketable cutflower yield per plot with a mean of 0.55 dozen.

Interaction effect. There were no significant interaction effects between the different chrysanthemum varieties and the different production practices on the number of non-marketable cutflower harvested per 1x2.5 cm plot.

Plate 1. Compost preparation with (a) the reasearcher and (b, and c) his siblings.

Plate 2. Overview of the experimental area at one month from transplanting of rooted cuttings.

Plate 3. Overview of the chrysanthemum plants during flower bud formation stage.

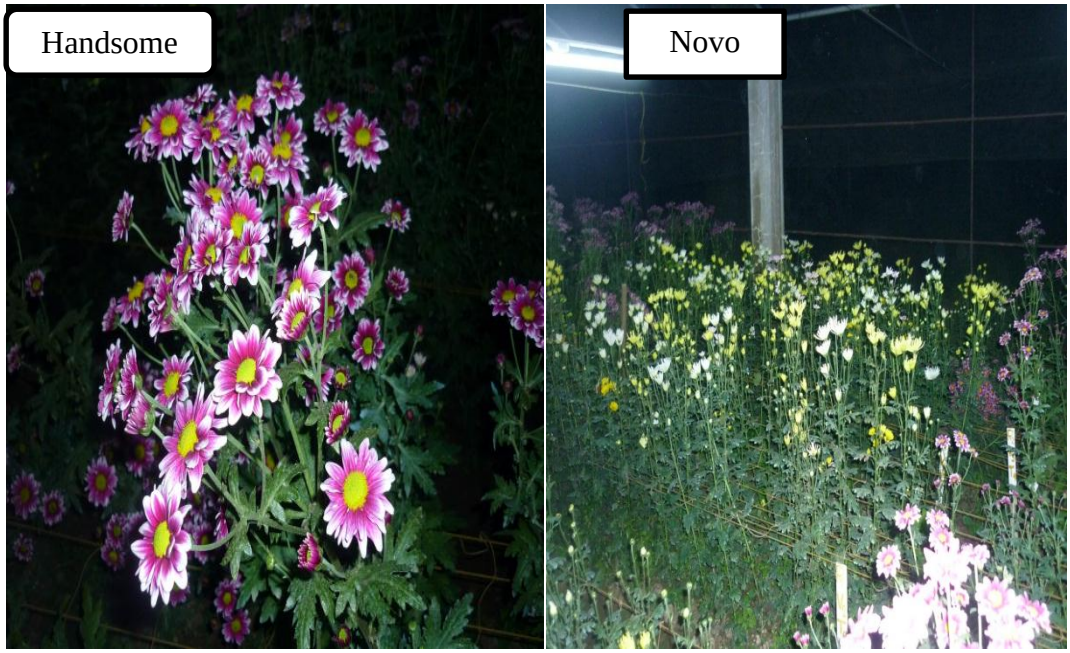

Plate 4. Overview of the various chrysanthemum varieties grown in the study at flowering stage.

Plate 5. Harvesting and packaging of the chrysanthemum cutflowers.

Table 13 Cost and return analysis

TREATMENT	MARKETABLE YIELD (doz)	GROSS SALES (P)	EXPENSES (P)	NET PROFIT (P)	ROCE (%)	RANK
Farmer's Practice						
Pink tube	15.26	534.1	457.08	77.02	16.85	3
Novo	15.25	533.75	457.08	76.67	16.77	4
Handsome	15.75	787.5	457.08	330.42	72.29	1
Mukusako-based						
Pink tube	15.26	534.1	445.42	58.68	13.17	5
Novo	13.66	478.1	445.42	2.68	0.60	12
Handsome	14.92	746	445.42	270.58	60.62	2
Sunflower-based						
Pink tube	14.75	354	345.42	8.50	2.46	10
Novo	14.58	349.92	345.42	4.5	1.30	11
Handsome	15.25	366	345.42	20.58	5.96	7
Nature's Crop-based						
Pink tube	14.5	348	337.92	10.08	2.98	9
Novo	14.58	349.92	337.92	12	3.55	8
Handsome	15.34	368.16	337.92	30.24	8.94	6

Note: Selling price per dozen during harvest was P 50.00 for A (medium), P35.00 for A (short), and P20.00 for Class B.
While P1-2.00 for chrysanthemum damaged by white rust.

Table 14. List of inputs in the study

INPUTS	QUANTITY	UNIT PRICE	TOTAL VALUE
A. Material Cost	4,4334	.60/cutting	2,600
I. Labor Cost			
a. Land practice	24 hrs.	10.00/hrs.	240.00
b. Transplanting cuttings and wire net installation	24 hrs.	10.00/hrs.	240.00
c. Fertilizer application	10 hrs.	10.00/hrs.	100.00
d. Irrigation	37 hrs.	10.00/hrs.	370.00
e. Disbudding	2 hrs.	10.00/hrs.	20.00
f. Weeding	3 hrs.	10.00/hrs.	30.00
g. Pinching	2 hrs.	10.00/hrs.	20.00
h. Harvesting	2 hrs.	10.00/hrs.	20.00
i. Packaging	2 hrs.	10.00/hrs.	20.00
TOTAL			3660.00
B. Fixed Cost			
Grab hoe	1	250	25
Knapsack sprayer	1	1500	150.00
Wire net	2 rolls	95/roll	190.00
TOTAL			365.00

Table 15. Additional expenses per treatment

INPUTS	QUANTITY	UNIT PRICE	TOTAL VALUE
Farmer's Practice			
I.Fertilizer			
a.Complete	2.5 kg	30.00/kg	75.00
b.Urea	3.5 kg	24.00/kg	84.00
c.Chicken manure	5 kg	1.80/kg	9.00
II. Pesticides			
a.Karate	100ml	68.00	68.00
b.Kumulus	½ kg	150.00	150.00
TOTAL			365.00
Mukusako-based			
Mukusako Liquid	5 li	60.00/li	300.00
Rice hull	1 ½ sack	20/ sack	30.00
TOTAL			330.00
Sunflower-based			
Rice hull	1 ½ sack	20/sack	30.00
TOTAL			30.00
Available Organic Fertilizer (Siglat)	3 kg	2.5/kg	7.50
TOTAL			7.50

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted to determine appropriate and suitable organic products for the production of quality chrysanthemum cutflower; establish a pre-production/production and postharvest management systems in the organic production of chrysanthemum cut flower; and determine the economics of using the different organic production practices in chrysanthemum cut flower production, using three common varieties grown for cut flower production under La Trinidad Benguet condition. The study was conducted at the BSU Ornamental Horticulture Research Area, La Trinidad Benguet from December 2012 to March 2013.

Among the varieties used 'Pink tube' and 'Handsome' produced more number of leaves, earliest to attain 0.5 cm flower bud size, and the fastest flower development from flower bud formation to harvesting stage. 'Handsome' produced bigger flowers and a high cutflower yield but was slightly comparable to 'Pink tube'.

On the effect of different production practices used, results showed that plants applied with sunflower-based practices numerically promoted the production of taller plants; more number of leaves produced but was slightly comparable to plant applied with the farmers' practice. Plants applied with mukusako-based practice produced thicker stems and bigger flowers at flowering. Application of sunflower-based practices reduces the number of days from transplanting to 0.5 cm flower bud size; while flower development from 0.5 cm bud size to harvesting stage was significantly reduced with the application of the farmer's practice.

Significant interaction effects were observed between the three varieties and the different organic production practices on the number of leaves at flowering, number of days from transplanting to 0.5 cm bud size, flower development from 0.5 cm flower bud size to harvesting; and on flower sizes. 'Handsome' applied with sunflower-based and Nature's Crop-based practices produced the highest number of leaves per plant. 'Novo' applied with farmer's practice produced the biggest flowers; but it was the latest to attain 0.5cm flower bud size and the latest to reach the harvestable stage (50% anthesis).

There were no significant interactions between the three mum varieties and the different production practices on the final height at flowering, stem thickness, cutflower stem length at harvest, marketable yield per plot, and the non-marketable yield per plot.

Conclusion

Based on the results presented and discussed, results showed that 'Pink Tube' and 'Handsome' were the best performing chrysanthemum varieties tested for organic chrysanthemum cutflower production since both produced more number of leaves, the earliest to produce 0.5 cm flower buds and had faster flower development to harvesting stage. 'Handsome' produced bigger flowers and a high cutflower yield that gave the highest return on cash expenses of 60.62 %, while 'Novo' gave the lowest cutflower quality and the lowest return on cash expenses of 0.60 % among the three varieties grown.

The use of sunflower-based production practice promoted the production of more number of leaves per plant; earliest to attain 0.5 cm bud size, while mukusako-based production practices promoted the production of bigger flowers.

Recommendation

Based on the findings ‘Handsome’ applied with mukusako-based production practices is recommended for organic chrysanthemum cutflower production since it produced thicker stems, bigger flowers and had a high ROCE of 60.62%

LITERATURE CITIED

BAUTISTA, O.K., H.V VALMAYOR, P.C. TABORA JR., R.R ESPINO, J. B. SANGALANG. 1983. Introduction to tropical Horticulture. UPLB, Los Banos, Laguna. P.231.

FOX O. 1985. Growing Lilies. Great Britain: Croom Helm Pub. P.33.

FRENCH. G. and A.C. ALSBURG. 1989. Comparison of controlled fertilizer for the production of Rhodendron "Anna Rave Whitney". Hort. Sci. 15:19.

GARDNER, V. R. 1949. Basic Horticulture. New York: The Macmillan Book Co.P.146.

GAUTAM, H. 2007. Dictionary of Agriculture. Rajat Publication New Delhi. P.202.

GENOVE,J.2006.Growth, Flowering and Yield of the Nile (*Agapanthus albus)* as Affected by Different Organic Materials.BS. Thesis (Unpub.) Benguet State University, La Trinidad, Benguet.P.4.

JANICK, J. 1972. Horticultural Science. San Francisco: W.H. Freeman Pub, and Co. Pp.158, 164-165, 328-329.

LADILAD, A.C. 1996. A Manual of Chrysanthemum Production in the Highlands.

LARSON, R. A. 1980. Introduction to Floriculture. New York: Academic Press Inc. P 9.

MARSHALL, C. and G. SAGA. 1976 Plant Structure, Function and Adaptation. New York: MacMillan Press, Ltd. Pp. 261-262

MENDIOLA, N. B. 1976. Principles of Crop Production on Southeast Asia. Caloocan City: United Circulation, Inc. P. 71.

MCVICKAR, M.H. 1970. Using Commercial Fertilizers. Illinois: The Interstate Pub. and Printers Corp. P201.

PCARRD. 1995. The Ornamental Horticulture. Philippine Council for Agriculture, Forestry and Natural Resource Research and Development, Laguna:Departmentof Science and Technology, Los Banos. ISBN 971-20-031-4. P.1.

PEARS, P. 2005.The Complete Guide to Natural and Chemical-free Gardening. Rondal's Illustrated Encyclopedia of Organic Gardening.DK Publishing Inc. New York.P.61.

REHM, K. G. 1994. Fertilizer Management and Technology. Houston, Texas: Academic Press,Inc. Pp.179-188.

SAGALLA, L. 2000. Analyses of different formulated compost and their effects in the performance of chrysanthemum (*Chrysanthemum morifolium)*. MS Thesis. La Trinidad Benguet. P.13.

SCOTTS, C. 1996. Growing medium and Fertilizer regime influence growth and essential oil content of rosemary .Hort. Sci. 26:91.

VELASCO, L.B. 2000. Response of Three Greenhouse Grown Spray Chrysanthemum Varieties to Planting Spacing. Benguet State Univiersity, La Trinidad, Benguet.

WATTS, R.L. 1972. Vegetable Gardening. New York: Orange Jude Pub. P.156.

YOKOMORI, .M. 2011. Farmers in Benguet Practice Savers Technology. Rianella Printing Press (Baguio City, Philippines).