BIBLIOGRAPHY

FERNANDEZ, HERMA V. APRIL 2010. Growth and Yield of Chives (Allium schoenoprasum as Affected by Different Kinds and Rates of Slow Release Fertilizer. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

The study was conducted to determine the efficacy of using slow release fertilizers on the growth, flowering and yield of chives, determine the appropriate kinds and rates of slow release fertilizer that can be used profitably for chive production under La Trinidad Benguet Condition and the economics of using the different slow release fertilizers in Chive production.

Results shows that the different kinds of slow release fertilizers had not significantly affected the height of the plants, number of leaves and number of slips produced at flowering. Application of Osmocote (15-9-12) and Osmocote (14-14-14) promoted earlier flowering of chives.

The different rates of slow release fertilizer application did not affect significant differences in all parameters gathered. Only slight differences were recorded on the growth and yield of the plants as affected by the different rates of application.

However, application of 10 g/pot Osmocote (15-9-12) promoted the highest yield of ROI, meanwhile 10 g/pot of Multicote (17-17-17) had also a comparable yield and ROI.

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INTRODUCTION

Chive (*Allium schoenoprasum L.*) belongs to the Amaryllis family, Amaryllidaceae, which are clump forming perennials. They are the smallest species of the onion family, they grow 30 to 50 cm tall. The bulbs are conical and measuring 2 to 3 long and 1 cm wide. They grow clustered from the roots instead of growing individually, the leaves are hollow, tubular, almost grass- like in shape and grow up to 50 cm long and 2 to 3 mm in diameter, the leaves are chopped and used as garnish and flavoring in salads, dips, soups, and cheeses due to its mild onion flavor. Flowers are pale purple and white, star-shaped with six petals, 1 to 2 cm wide that are produced in a dense inflorescence surrounded by papery bract border; it is edible and contain large amounts of Vitamin C. Nowadays herb are most commonly known for their culinary, medicinal, aromatic and decorative qualities (Poincelot, 2004).

Osmocote and Multicote fertilizer formulations which are controlled release fertilizer can be applied in soil from the field capacity to permanent wilting capacity point moisture level with no significant differences in the rate of nutrient release in wide ranges of soil pH 4.0 to 6.9. Osmocote and multicote formulations upon applications, the nutrients are released over a period of time. Osmocote has three to four months longevity (14-14-14) and Multicote (17-17-17) has three months longevity. Multicote granule is a mixture of NPK encapsulated into biodegradable polymer coating that does not contain Chlorine. Osmocote granules are coated with resin and when moisture penetrates the coating, it will make salts soluble. Slow release fertilizer compared to the other forms of fertilizers has minimum detrimental effects on the soil and atmospheric environments due to the controlled release of nutrients into the soil solution and ground water, preventing

further deterioration of global environment. Since Osmocote and Multicote releases slowly, it does not cause injury of seed and roots of developing plants. A study conducted by Rehm (1994) showed that a sustained profit in a farm enterprise is highly dependent on achieving optimum yield with most efficient use of inputs.

Most plants was lost or will revert to less desirable forms unless they are domesticated and propagated under controlled conditions that preserve the unique characteristics that make them useful (Hartmann *et al.,* 1986).

At present, most of the farmers spend a big percentage of their capital for fertilizers alone. Most of them also prefer a quick release type of fertilizer because they want to see the immediate effect to their crop in a shorter span of time as possible. In reality they are not aware that they are not following the efficient and right amount of fertilizers applied, maybe sometimes they obtained less profit from the previous croppings so they add more fertilizers the following cropping in hope of greater yield. The result then is that they are degrading their soil and rendering it to be more acidic soil. Slow release type of fertilizer is proven to be more economical because one application per cropping is sufficient to supply the required nutrient of crops, and an efficient way of taking care of the soil.

Chives are grown not as a main crop, in most cases they are grown as secondary crop. Some gardeners used chives as a perennial edging or border plant in an herb garden because of their leaves and flower for culinary and medicinal uses. Fertilizing them therefore is necessary, so it is essential to know the best type of slow release fertilizer used and the right amount that best correspond to their required need until harvest.

The study was conducted at the Benguet State University Ornamental Research Area, La Trinidad Benguet from October to March 2010 to determine the efficacy of using slow release fertilizers on the growth, flowering and yield of chives; determine the appropriate kinds and rates of slow release fertilizers that can be used profitably for chive production under La Trinidad, Benguet, determine the economics of using the different fertilizer treatments.

REVIEW OF LITERATURE

The Plant

Chives are a member of the onion family; it grows to about 45 cm in height and produces an attractive purple and white flower similar to pom-pom in shape. Chives are perennial plant and can also be used as an organic means of repelling aphids.

Fertilizer Application

Fertilizer is one of the most important ingredients of the total recipe to grow plants. Plants do need water, air, light, nutrition, soil and temperature all in right ratio at the right moment and during all right period (Scotts, 1996). The rate of application of chemical fertilizers depend such factors as: 1) the character of the soil; 2) the previous crop grown and the manner in which it was fertilized; 3) the moisture conditions; 4) the importance of early maturity; 5) the possibility of early irrigation; 6) the amount of land available; and 7) the amount of fertilizer to be applied to the soil depends on the recommended rate of application and the percentage nutrient content or grade of the fertilizer materials (Watts, 1972).

Faustino (1998), mentioned that slow release fertilizers promised to be the acceptable method of fertilization from an environmental stand point of view. They currently occupy a small niche in the over all market for chemical fertilizer, as technologies continue to evolve.

French and Alsburg (1989), cited that the major advantage of slow release fertilizer is that a single application can provide the majority of the nutrient for the

growing season. Following the necessary method of application, production of superior quality plants can be obtained.

Buyas (1994), found that basal application of N-P_2O_5-K_2O was needed to promote the growth of stems and leaves of plants

Day-a (1987), mentioned that plant fertilized with slow released fertilizer through Osmocote were pale green but were predominantly fibrous.

Fertilizer Rates

Chaong (1987), stated that application of 75-75-75 or 100-100-100 kg NPK/ ha improved plant height, increased the number of leaves produced at anthesis, produced longer stem, bigger blooms, greater number of suckers per plant and increased yield of cut flowers per area in Shasta daisy.

Day-a (1999), applied Osmocote Triple 14 and Multicote Triple 17 slow release fertilizer formulations in chrysanthemum cut flower production, applied as basal fertilizer at the rate of 60-60-60 kg NPK/ha. She found that Osmocote Triple 14 and 70-70-70 kg NPK /ha Multicote is beneficial in the production of quality chrysanthemum cut flowers.

Torio (2000), also showed that comparable plant height, number of leaves, total leaf area, stem length, cut flower yield, flowering and duration of flower development were recorded in snapdragon fertilized with 70-70-70, 90-90-90 and 120-120-120 kg N-P_2O_5-K_2O /ha.

Aust (2008), slow release fertilizer are generally comprised of organic, natural, or recycled materials, making them much more healthy for the environment. They also release the appropriate amount of nutrients to your vegetables and flowers without wasting material or requiring frequent re-application. These fertilizers also tend to stay

around longer in garden. If it is applied large amount, the plant roots will not be burned because only a little is released at a time, and the fertilizer will be available over a long period of time which means the gardener does not have to re-apply fertilizer as often. Slow release fertilizer helps reduce water pollution because it is not which soluble and nutrient are released in useful amounts means they aren't washed away in storm water run-off.

Quick release fertilizers are readily available to a plant and are often water soluble. With slow release, the nutrients are released over a period of time, which is sometimes dependent on temperature and the amount of moisture that's provided to the plant.

MATERIALS AND METHODS

The materials used in the study were bulbs of chives, different kinds of slow release fertilizers, measuring sticks, foot rule, plastic pots (6 inches in diameter), weighing scale, and labeling materials.

The study was laid out following the Randomized Complete Block Design (RCBD) in Factorial arrangement replicated four times. The different kinds of slow release fertilizers was assigned as Factor A and the rates of application as Factor B. There were three sample plants per treatment replication. The treatment was as follows:

Factor A: Kind of Slow Release Fertilizer

F_1-No fertilizer applied

F_2- Multicote 17-17-17

F_3- Agroblen 18-6-12

F_4- Osmocote 14-14-14

F_5- Osmocote 15-9-12

F_6- Complete 14-14-14

Factor B- Rates of fertilizer Application (g/pot)

R_1- 5

R_2- 10

R_3- 15

Planting. Three healthy bulbs of chive were properly planted per pot, following the recommended spacing.

Fertilizer application. The different fertilizer treatments were applied once, at planting time.

Growing media. The soil used as growing media is a mixture of sandy loam and BSU compost in a 2:1 ratio.

Care and maintenance. Cultural management practices such as weeding, crop protection and irrigation were done uniformly as recommended.

Data gathered. The data gathered was tabulated, computed and the means was compared using the Duncan's Multiple Range Test (DMRT).

A. Vegetative Growth

1. Final height at flowering (cm). These were obtained by measuring the final height of the plant from the base up to the flowering at close bud stage.

2. Number and weight of leaves per plant at flowering (g). This was gathered by counting the number and weighing of leaves at flowering.

3. Number of slips produced at harvest. This was taken by counting the number of slips produced during harvest.

B. Reproductive Growth

1. Number of days from planting to flower bud formation. This was the duration from planting to the formation of 1 cm bud size.

C. Yield and Yield Components

a. Total weight of harvested chives per treatment (g). This was taken by weighing the harvested chive leaves.

D. Occurrence of insect pests and diseases

E. Cost and return analysis. The study was recorded and the return on investment was computed using the formula.

$$\text{ROI (\%)} = \frac{\text{Gross sale} - \text{Total expenses}}{\text{Total expenses}} \times 100$$

F. Documentation of the study. This was obtained through pictures from flowering stage and harvesting.

RESULTS AND DISCUSSION

Plant Height at Flowering

Effect of kinds of slow release fertilizer. The height of the experimental plants at flowering was measured at close bud stage. Result show that there were no significant differences noted on the plant heights as an effect of the different kinds of slow release fertilizer applied (Table 1). There were slight differences in plant height among the different treatments. Osmocote (14-14-14) had the tallest plant with a mean of 53.17 cm, while complete (14-14-14) recorded the lowest mean on height measurement which is shorter than the control (no fertilizer applied). Figure 1 shows an overview of the experimental plants at flowering.

Table 1. Final height at flowering

TREATMENT	FINAL HEIGHT (cm)
Kinds of Slow Release Fertilizer	
No fertilizer applied	52.33[a]
Multicote (17-17-17)	52.00[a]
Agroblen (18-6-12)	52.58[a]
Osmocote (14-14-14)	53.17[a]
Osmocote (15-9-12)	51.50[a]
Complete (14-14-14)	50.17[a]
Rates of fertilizer Application (g/pot)	
5	51.63[a]
10	52.29[a]
15	51.96[a]
FxR	ns
CV	9.05

Means with the same letter are not significantly different at 5% level by DMRT

Figure 1. Overview of the experimental plants at flowering

Effect of rate of application. Table 1 shows that there was no marked differences rated among the rates of fertilizer applied with 10 g/pot was slightly taller (52.29 cm) than the other treatment, 5g/pot and 15 g/pot with a mean of (51.63) and (51.96) respectively.

Interaction effect. There was no significant interaction effect noted on the kinds and rates of fertilizer applied on the measured height of the plants.

Number of Leaves per Plant
at Flowering

Effect of kinds of slow release fertilizer. There were no appreciable differences recorded on the average number of leaves of the plants as counted at flowering stage. There were slight differences but statistically it was found not significant; Multicote (17-

17-17), Osmocote (15-9-12) and Osmocote (14-14-14) produced the highest leafcount at flowering with a mean of 13.58, 13.08 and 13.00 respectively. Meanwhile control (no fertililizer applied) produced the lowest leafcount at flowering with a mean of 11.33 (Table 2).

Effect of rates of application. As shown in Table 2, there were no significant differences realized statistically on the leaf count per plant at flowering as an effect of the different rate of application. The highest mean was recorded on the 10 g/pot rate of application.

Interaction effect. There were no interaction effect realized on the number of leaves counted at flowering as affected by the different kinds and rates of slow release fertilizer.

Table 2. Number of leaves/treatment at flowering

TREATMENT	NUMBER OF LEAVES
Kinds of Slow Release Fertilizer	
No fertilizer applied	11.33[a]
Multicote (17-17-17)	13.58[a]
Agroblen (18-6-12)	11.75[a]
Osmocote (14-14-14)	13.00[a]
Osmocote (15-9-12)	13.08[a]
Complete (14-14-14)	12.67[a]
Rates of fertilizer Application (g/pot)	
5	12.79[a]
10	13.08[a]
15	11.83[a]
FxR	ns
CV	17.82

Means with the same letter are not significantly different at 5% level by DMRT

Weight of Harvested Leaves

Effect of kinds of slow release fertilizer. Result of the weight of harvested leaves per plant as affected by the different kinds of slow release fertilizer shows that there was a highly significant difference among the treatments (Table 3). Osmocote (15-9-12) recorded the heaviest harvested leaves with an averege of 17 g per plant followed by Osmocote (14-14-14) and Multicote (17-17-17) with an average weight of 14.75 and 14.42 respectively. Meanwhile the control (no fertilizer applied) had the lowest weight of harvested leaves. This is because it was observed that although there was no significant differences noted on the number of leaves produced at flowering among the treatments, the harvested leaves on the plants applied with Osmocote (15-9-12) was wider and thicker in comparison with the leaves produced by the unfertilized plants (Control).

Effect of rates of application. Table 3 shows that although not statistically significant result showed that application of 10 g/pot of the different kind of slow release fertilizers recorded the heaviest leaves harvested per plant. Application of 10 g/pot had an average weight of 13.92 g while the lightest was recorded on application of 5g/pot.

Interaction effect. There were no significant interaction effects realized between the kinds and rates of slow release fertilizer on the weight of chive leaves harvested. Figure 2 and 3 shows the harvested chive leaves as affected by different kinds and rates of slow release fertilizers.

Table 3. Weight of harvested leaves

TREATMENT	MEAN (g)
Kinds of Slow Release Fertilizer	
No fertilizer applied	10.50[c]
Multicote (17-17-17)	14.42[ab]
Agroblen (18-6-12)	12.33[bc]
Osmocote (14-14-14)	14.75[ab]
Osmocote (15-9-12)	17.00[bc]
Complete (14-14-14)	12.42[a]
Rates of fertilizer Application (g/pot)	
5	13.21[a]
10	13.96[a]
15	13.54[a]
FxR	ns
CV	25.60

Means with the same letter are not significantly different at 5% level by DMRT

Figure 2. Harvested chive leaves as affected by different kinds and rates of slow release fertilizers

Figure 3. Harvested chive leaves as affected by different kinds and rates of slow release fertilizers

Number of Slips at Harvest

Effect of kinds of slow release fertilizer. Results of the number of slips produced per plant at flowering shows that there was no differences among the treatment (Table 4). Almost all of the treatments produced an average of two slips at flowering. Slightly higher slip counts was recorded on Osmocote (14-14-14) with a mean of 2.17.

Effect of rates of application. Table 4 reveals that there was no marked difference on the number of slips produced by the plants as affected by rates of slow release fertilizer. Almost all plants produced a mean of two slips.

Interaction effect. There were no interaction effects on the number of slips produced per plant at flowering as affected by the different kinds and rates of slow release fertilizers.

Table 4. Number of slips at harvest

TREATMENT	NUMBER OF SLIPS
Kinds of Slow Release Fertilizer	
No fertilizer applied	2.00[a]
Multicote (17-17-17)	1.92[a]
Agroblen (18-6-12)	1.92[a]
Osmocote (14-14-14)	2.17[a]
Osmocote (15-9-12)	2.00[a]
Complete (14-14-14)	2.00[a]
Rates of fertilizer Application (g/pot)	
5	2.00[a]
10	1.90[a]
15	2.04[a]
FxR	ns
CV	20.35

Means with the same letter are not significantly different at 5% level by DMRT

Number of Days from Planting to Flower Bud Formation

Effect of kinds of slow release fertilizer. Table 5 shows that a highly significant difference was manifested by the plants on the number of days from planting to flower bud formation as affected by different kind of slow release fertilizer. Plants applied with Osmocote (15-9-12) and Osmocote (14-14-14) developed flower bud earlier with an average of 94.25 and 95.50 DAP respectively. Plants applied with complete (14-14-14) and Agroblen (15-9-12) recorded the longest to develop flower bud. This can attribute by variation among the planting materials or the contents present on the different slow release fertilizer which promote earlier flower development. This corroborates with the findings of Palao-ay 2009 in her study (Effect of different Kinds and Rates of Slow Release Fertilizer on the growth and flowering of Hydrangea) she noted that Agroblen (15-9-12) promotes earlier flowering of Hydrangea.

Effect of rates of application. No significant differences were obtained on the number of days to flower bud formation as affected by the rates of application (Table 5). The table shows that increasing the rate of slow release fertilizer promotes earlier flowering of the plants (Table 5).

Interaction effect. There were no significant interaction effects manifested by the different kinds and rates of slow release fertilizer on the number of days from planting to flower bud formation of chive plants.

Table 5. Number of days from planting to flower bud formation

TREATMENT	NUMBER OF DAYS
Kinds of Slow Release Fertilizer	
No fertilizer applied	102.25[ab]
Multicote (17-17-17)	102.33[ab]
Agroblen (18-6-12)	107.83[a]
Osmocote (14-14-14)	95.50[b]
Osmocote (15-9-12)	94.25[a]
Complete (14-14-14)	110.67[a]
Rates of fertilizer Application (g/pot)	
5	104.38[a]
10	102.79[a]
15	99.25[a]
FxR	ns
CV	11.10

Means with the same letter are not significantly different at 5% level by DMRT

Return on Investment

The return on investment computed from the different fertilizer treatments is presented on Table 6. Results of computation shows that application of Osmocote (15-9-12) with a rate of 10 g/pot recorded the highest net income, followed by Multicote (17-17-17) with 5 g/pot application and Osmocote (15-9-12) with a rate of 15 g/pot. However the highest ROI was obtained by the application of 10 g/pot of of Osmocote (15-9-12) with a ROI of 124%, 5 g/pot of Multicote (17-17-17) and 10 g/pot of Complete (14-14-14) which has a computed ROI of 113% and 104%. Meanwhile, the lowest ROI was recorded from the application of 15 g/pot of Multicote (17-17-17) and 5 g/pot application of Agroblen (18-6-12). The computed ROI of the different treatments did not correspond

to the yield because of their variation on the total expenses, the control (no fertilizer) had a comparable ROI with the other because it has the lowest expenses while the highest expenses was obtained in the application of 15 g/pot Multicote (17-17-17) and 5 g/pot Agroblen (18-6-12) .

Occurrence of Insect Pest and Disease

There were no serious insect pest or disease in chive encountered during the study.

Table 6. Return On Investment (ROI)

TREATMENT	YIELD (g/pot)	GROSS SALES (PhP)	TOTAL EXPENSES	NET INCOME	ROI (%)
Control	127	34.68	29.94	4.74	10
Multicote(17-17-17) 5 g/pot	203	71.05	33.37	37.68	113
10 g/pot	166	58.00	38.97	19.00	49
15 g/pot	152	53.20	44.57	8.63	19
Agroblen (18-6-12) 5 g/pot	152	53.20	44.57	8.63	19
10 g/pot	127	54.95	37.44	17.51	47
15 g/pot	146	51.00	42.26	8.74	21
Osmocote(14-14-14) 5 g/pot	183	64.00	32.60	31.40	96
10 g/pot	145	50.75	37.44	13.31	36
15 g/pot	199	69.65	42.26	27.39	65
Osmocote (15-9-12) 5 g/pot	160	56.00	32.60	23.40	72
10 g/pot	239	83.65	37.40	46.25	124
15 g/pot	200	70.00	42.26	27.74	66
Complete(14-14-14) 5 g/pot	127	44.45	28.27	16.18	14
10 g/pot	168	58.80	28.77	30.00	104
15 g/pot	144	50.40	28.27	22.13	78

*Total expenses include: planting materials, plastic pots, slow release fertilizers
* Priced at PhP 35/ 100g in the month of March 2010

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The study was conducted to determine the efficacy of using slow release fertilizers on the growth flowering and yield of chives, determine the appropriate kinds and rates of slow release fertilizer that can be used profitably for Chive production under La Trinidad, Benguet and the economics of using the different kinds of slow release fertilizer treatments.

Results showed that the different Kinds of slow release fertilizer applied had not affected the height of the plants, there were slight differences noted. In terms of leaf count at flowering there were also marked differences among the kinds of slow release fertilizer applied in affecting the number of leaves of the plant, although not statistically significant application of Multicote(17-17-17), Osmocote (15-9-12) and Osmocote (14-14-14) had a higher leaf count than the slow release fertilizer. It was noted that plants applied with Osmocote (15-9-12) and Osmocote (14-14-14) developed flower bud earlier than the other slow release fertilizer no significant differences was noted on the number of slips produced at flowering.

Effect of the rates of application of slow release fertilizer on the growth and yield of chives was found not significant in all the parameter considered. The different rates of application had not affected the plant performance, only it was observed that increasing the rate promotes earlier flowering of the plants.

As to the interaction between the kinds and rates of the slow release fertilizer application, it was found no significance. However Higher ROI was computed on the

application of 5g/pot Multicote, 10 g/pot Complete (14-14-14) and 10 g/pot Osmocote (15-9-12).

Conclusions

It is therefore concluded that application of Osmocote (15-9-12) and Osmocote (14-14-14) to chive plant improved the growth, flowering and yield of the crop. Application of 10 g.pot of Osmocote (15-9-12) enhanced the production of thicker and heavier leaves of the plants and registered the highest ROI at 124%; followed by application of 5 g/pot Multicote (17-17-17) with 113% ROI. On the other hand application of 10 g/pot of Complete (14-14-14) fertilizer produce ROI with these applied with slow release fertilizers because it had the lowest expenses or cost of production.

Recommendations

Based on the findings of the study, application of 10 g/pot of Osmocote (15-9-12) is the best slow release fertilizer for chive production as to the yield and to return on investment which was 124%.

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APPENDICES

Appendix Table 1. Final height at flowering (cm)

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
F_1R_1	58	58	55	44	215	54
R_2	45	53	51	56	202	51
R_3	50	50	54	57	211	53
$F2R_1$	57	43	55	48	205	51
R_2	55	53	57	52	217	54
R_3	53	49	48	52	202	51
$F3R_1$	45	49	47	58	199	50
R_2	55	51	53	57	216	54
R_3	54	57	57	48	216	54
F_4R_1	48	54	61	50	213	53
R_2	54	56	53	52	215	54
R_3	52	53	56	49	210	53
$F5R_1$	44	58	52	51	212	53
R_2	53	49	58	47	199	50
R_3	53	53	51	55	207	52
F_6R_1	51	52	61	40	195	49
R_2	52	58	53	41	206	52
R_3	45	51	56	50	201	50

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F 0.05	TABULATED F 0.01
Replication	3	112.0417	37.3072			
Factor A	5	64.9583	12.9917	0.59^{ns}	2.41	3.43
Factor B	2	5.3333	2.6667	0.12 ^{ns}	3.22	5.08
AB	10	136.3333	13.6333	0.62 ^{ns}	1.95	2.72
Error	51	1128.2083	22.1217			
TOTAL	71	1446.8750				

^{ns} -not significant

Coefficient of variation = 9.05 %

Appendix Table 2. Number of leaves/treatment at flowering

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
F_1R_1	8	10	12	12	42	11
R_2	12	12	13	11	48	12
R_3	12	10	13	11	48	
$F2R_1$	12	13	18	12	46	12
R_2	12	13	16	16	57	14
R_3	14	11	16	10	51	13
$F3R_1$	13	11	12	16	52	13
R_2	7	10	12	13	42	11
R_3	11	11	11	14	50	13
F_4R_1	15	12	13	18	58	15
R_2	12	12	15	10	49	12
R_3	11	10	15	13	49	12
$F5R_1$	13	11	19	11	54	14
R_2	11	18	17	13	59	15
R_3	10	11	9	9	59	10
F_6R_1	11	12	10	13	46	12
R_2	15	15	13	16	59	15
R_3	12	18	12	10	52	13

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F 0.05	0.01
Replication	3	36.9306	12.3102			
Factor A	5	44.2361	8.8472	1.76^{ns}	2.41	3.43
Factor B	2	20.5278	10.2639	2.05^{ns}	3.22	5.08
AB	10	90.1389	9.0139	1.80^{ns}	1.95	2.72
Error	51	255.8194	5.0161			
TOTAL	71	447.6528				

^{ns} -not significant

Coefficient of variation = 17.82%

Appendix Table 3. Weight of harvested leaves per treatment (g)

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
F_1R_1	7	11	11	12	41	10.25
R_2	14	9	13	11	47	11.75
R_3	10	10	9	9	48	12.00
$F2R_1$	20	9	15	15	65	16.25
R_2	12	14	16	16	57	14.25
R_3	14	8	10	10	51	12.75
$F3R_1$	15	11	16	16	52	13.00
R_2	8	10	16	16	43	10.75
R_3	13	11	17	17	53	13.25
F_4R_1	14	11	18	18	61	15.25
R_2	13	10	7	7	49	12.25
R_3	17	17	14	14	67	16.75
$F5R_1$	9	8	13	13	43	10.75
R_2	11	19	17	10	57	14.25
R_3	10	19	15	5	49	12.25
F_6R_1	10	15	15	15.	55	13.75
R_2	18	16	21	21	82	20.50
R_3	15	20	16	16	53	13.25

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F 0.05	TABULATED F 0.01
Replication	3	89.8194	29.9398			
Factor A	5	313.9028	62.7806	5.20**	2.41	3.43
Factor B	2	6.7778	3.3889	0.28ns	3.22	5.08
AB	10	201.7222	20.1722	1.67ns	1.95	2.72
Error	51	615.4306	12.0673			
TOTAL	71	1227.6528				

** – highly significant
ns - not significant

Coefficient of variation = 25.60%

Appendix Table 4. Number of slips at harvest

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
F_1R_1	2	2	2	2	8	2.00
R_2	2	2	2	2	8	2.00
R_3	2	2	2	2	8	2.00
$F2R_1$	2	1	2	2	7	1.75
R_2	2	2	2	2	8	2.00
R_3	2	2	2	2	8	2.00
$F3R_1$	2	2	2	2	8	2.00
R_2	1	1	2	2	6	1.50
R_3	3	2	2	2	8	2.00
F_4R_1	2	2	2	3	9	2.25
R_2	2	3	2	2	9	2.25
R_3	2	2	2	2	8	2.00
$F5R_1$	2	1	3	3	9	2.25
R_2	1	2	2	2	7	1.75
R_3	2	2	2	2	8	2.00
F_6R_1	1	2	2	2	7	1.75
R_2	2	3	2	2	9	2.25
R_3	2	2	2	2	8	2.00

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F 0.05	0.01
Replication	3	0.5556	0.1852			
Factor A	5	0.5000	0.1000	0.60^{ns}	2.41	3.43
Factor B	2	0.0833	0.0417	0.25^{ns}	3.22	5.08
AB	10	2.4167	0.2417	1.46^{ns}	1.95	2.72
Error	51	8.4444	0.1656			
TOTAL	71	12.0000				

^{ns} -not significant Coefficient of variation = 20.35%

Appendix Table 5. Number of days from planting to flower bud formation

TREATMENT	REPLICATION				TOTAL	MEAN
	I	II	III	IV		
F_1R_1	111	105	108	87	411	103
R_2	108	113	105	79	405	101
R_3	110	102	110	89	411	103
$F2R_1$	103	111	112	108	434	109
R_2	121	117	98	98	434	109
R_3	100	108	79	73	360	90
$F3R_1$	104	113	109	106	432	108
R_2	109	107	121	111	448	112
R_3	121	105	81	107	414	104
F_4R_1	116	77	98	99	390	98
R_2	108	96	92	76	373	93
R_3	112	83	75	114	384	96
$F5R_1$	110	129	112	104	455	114
R_2	107	110	114	100	431	108
R_3	114	117	114	97	442	111
F_6R_1	121	98	86	78	383	96
R_2	106	96	78	97	377	94
R_3	108	110	78	75	371	93

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F 0.05	TABULATED F 0.01
Replication	3	2805.8333	935.2778			
Factor A	5	2538.1111	507.6222	3.95**	2.41	3.43
Factor B	2	330.5287	165.2639	1.29^{ns}	3.22	5.08
AB	10	864.9722	86.4972	0.67^{ns}	1.95	2.72
Error	51	6557.1667	128.5719			
TOTAL	71					

** - highly significant
ns - not significant

Coefficient of variation = 11.10%

Appendix Table 6. Return On Investment (ROI)

Treatment	Yield (g/pot)	Gross sales (PhP)	Total expenses	Net Income	ROI (%)
Control	127	34.68	29.94	4.74	10
Multicote(17-17-17) 5 g/pot	203	71.05	33.37	37.68	113
10 g/pot	166	58.00	38.97	19.00	49
15 g/pot	152	53.20	44.57	8.63	19
Agroblen (18-6-12) 5 g/pot	152	53.20	44.57	8.63	19
10 g/pot	127	54.95	37.44	17.51	47
15 g/pot	146	51.00	42.26	8.74	21
Osmocote(14-14-14) 5 g/pot	183	64.00	32.60	31.40	96
10 g/pot	145	50.75	37.44	13.31	36
15 g/pot	199	69.65	42.26	27.39	65
Osmocote (15-9-12) 5 g/pot	160	56.00	32.60	23.40	72
10 g/pot	239	83.65	37.40	46.25	124
15 g/pot	200	70.00	42.26	27.74	66
Complete(14-14-14) 5 g/pot	127	44.45	28.27	16.18	14
10 g/pot	168	58.80	28.77	30.00	104
15 g/pot	144	50.40	28.27	22.13	78

*Total expenses include: planting materials (bulbs of chives), plastic pots, slow release fertilizers, labor

* Priced at PhP 35/ 100g in the month of March 2010