BIBLIOGRAPHY

JOHN G. LIWEN JR. APRIL 2013. Growth and Flowering of Chrysanthemum (*Dendranthema grandiflora*) Cv. Reagan Series as Affected by Different Rates of Osmocote 14-13-13 Application. Benguet State University, La Trinidad Benguet.

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ABSTRACT

This study was conducted at the Ornamental Horticulture Research Area, Benguet State University, La Trinidad Benguet from December 2011 to March 2012, to determine the effects of different rates of osmocote 14-13-13 in chrysanthemum Cv. Reagan Series.

Rooted shoot tip cuttings of spray chrysanthemum Cv. Reagan Series were grown under plastic- roofed greenhouse and applied with different rates of Osmocote 14-13-13 at 20, 40, 60 g/ sq. m. singly or in combination with 80-80-80 kgs NPK/ha (recommended rate).

Earliest to form flower buds and to attain 50% anthesis were the plants with no fertilizer application. Plants applied with Osmocote 14-13-13 at 60 g/ sq. m. + the recommended rate of 80-80-80 kgs NPK/ha and those applied with Osmocote 14-13-13 at 40 g/sq. m. in combination with the recommended rate of fertilizer had significantly delayed flowering due to longer vegetative growth.

Significantly taller plants were produced with the application of Osmocote 14-13-13 at 60 g/sq. m. Osmocote alone or in combination with the recommended rate of 80-80-80 kgs NPK/ha.

Likewise, higher number of bigger sized flowers per stem was obtained in plants applied with 60 g/sq. m. Osmocote 14-13-13 + the recommended rate at full bloom stage. Cutflowers harvested had significantly longer stems which were classified as A long in plants applied with 60 g/sq. m. Osmocote 14-13-13 at 20, 40 and 60 g/sq. m. plus the recommended rate.

The highest ROI of 62.59% was computed from plants applied with Osmocote 14-13-13 at 60g/sq. m. plus the recommended rate of 80-80-80 kgs NPK/ha, having the highest gross income of Php 25, 680.00 and a net return of Php 9, 885.7 in a 100 sq. m. area.

RESULTS AND DISCUSSION

Final Height at Flowering

Significant differences were obtained on the final height at flowering as affected by the application of different rates of osmocote 14-13-13 as shown in Table 1. Tallest plants were produced from the plants applied with 80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/sq. m. which had a mean of 70 cm. height at flowering. Comparable with the application of 80-80-80 kgs. NPK/ha + Osmocote 14-13-13 at 40 and 20g/sq. m. and with the application of osmocote 14-13-13 at 60g/sq. m. only which has means that ranges from 68.67 to 69 cm. height at flowering. The shortest plants were obtained from the plants with no fertilizer application which have a mean of 53.67.

Table 1. Final height at flowering (cm)

TREATMENT	MEAN (cm)
No fertilizer application	53.67c
Osmocote 14-13-13 at 20 g/sq m	55.67c
Osmocote 14-13-13 at 40 g/sq m	59.67bc
Osmocote 14-13-13 at 60 g/sq m	68.67a
80-80-80 kgs NPK/ha (recommended rate)	63.33ab
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 20 g/sq m	68.67a
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40 g/sq m	69.00a
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/sq m	70.00a

Means followed by a common letter are not significantly different at 5% level (DMRT).

Number of leaves per plant at Flowering

Table 2 shows that there were significant differences on the number of leaves per plant at flowering as affected by the application of different rates of Osmocote 14-13-13. Plants applied with Osmocote 14-13-13 at 60g/sq.m produced the most number of leaves which had a mean of 33.67compared to other applications that includes the control that had produced the lowest number of leaves per plant with a mean of only 24.33 numbers of leaves per plant at flowering.

Table 2. Number of leaves per plant at flowering

TREATMENT	MEAN
No fertilizer application	24.33c
Osmocote 14-13-13 at 20 g/sq m	30.33b
Osmocote 14-13-13 at 40 g/sq m	32.33ab
Osmocote 14-13-13 at 60 g/sq m	33.67a
80-80-80 kgs NPK/ha (recommended rate)	30.67ab
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 20 g/sq m	30.33b
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40 g/sq m	31.33ab
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/sq m	32.67ab

Means followed by a common letter are not significantly different at 5% level (DMRT)

Stem Diameter at flowering (cm)

Table 3 shows that there were no significant effects of the application of different rates of Osmocote 14-13-13 on the stem diameter at flowering. However, plants applied with 80-80-80 kgs. NPK/ha + osmocote 14-13-13 at 60 g/sq. m. produced the thickest stem diameter at flowering with a means of of 1.22 cm followed by means ranges from 1.13 cm, 1,10 cm, 1.07 cm respectively. The thinnest stem diameter at flowering was obtained from the plants with no fertilizer application with a mean of 0.95 cm.

Table 3. Stem diameter at flowering (cm)

TREATMENT	MEAN (cm)
No fertilizer application	0.95
Osmocote 14-13-13 at 20 g/sq m	1.05
Osmocote 14-13-13 at 40 g/sq m	1.07
Osmocote 14-13-13 at 60 g/sq m	1.10
80-80-80 kgs NPK/ha (recommended rate)	1.13
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 20 g/sq m	0.98
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40 g/sq m	1.10
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/sq m	1.22

Means followed by a common letter are not significantly different at 5% level (DMRT)

Number of Days From Transplanting to Flower Bud Formation (0.5 cm bud size)

Table 4 shows that there were significant effects of the application of different rates of Osmocote 14-13-13 on the number of days from transplanting to flower bud formation at 0.5 cm bud size. Application of 80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 20 g/sq. m. delayed the formation of the flower buds which had a mean of 41.33 days compared to other treatments. This was followed by the application of 80-80-80 kgs. NPK/ha which was the recommended rate with a mean of 41 days. Plants that had earlier flower bud formation were obtained from the plants with no fertilizer application which had a mean of 36.67 days from transplanting.

Table 4. Number of days from transplanting to flower bud formation (0.5 cm bud size)

TREATMENT	MEAN (days)
No fertilizer application	36.67c
Osmocote 14-13-13 at 20 g/sq m	37.00bc
Osmocote 14-13-13 at 40 g/sq m	40.67abc
Osmocote 14-13-13 at 60 g/sq m	39.33abc
80-80-80 kgs NPK/ha (recommended rate)	41.00ab
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 20 g/sq m	41.33a
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40 g/sq m	37.33abc
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/sq m	40.00abc

Mean followed by a common letter are not significantly different at 5% level (DMRT).

Number of Days From Flower Bud Formation to Harvesting Stage (50% anthesis)

Table 5 shows that there were no significant effects on the different rates of Osmocote 14-13-13 application with regards to the number of days from flower bud formation to harvesting stage at 50% anthesis.However, application of 80-80-80 kgs.NPK/ha + Osmocote 14-13-13 at 20g/sq.m.had the more number of days from flower bud formation to harvesting stage. The plants with no fertilizer application had the earliest flower development from flower buds formation to harvesting stage at 50% anthesis.

Table 5. Number of Days from flower bud formation to harvesting stage (50% anthesis)

TREATMENT	MEAN (days)
No fertilizer application	22.67
Osmocote 14-13-13 at 20 g/sq m	25.67
Osmocote 14-13-13 at 40 g/sq m	25.00
Osmocote 14-13-13 at 60 g/sq m	28.00
80-80-80 kgs NPK/ha (recommended rate)	29.33
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 20 g/sq m	31.67
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40 g/sq m	30.67
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/sq m	22.67

Means followed by a common letter are not significantly different at 5% level (DMRT)

Stem Length of Cutflower at Harvest (cm)

Table 6 shows the application of different rates of Osmocote 14-13-13 had significantly affected the stem length of cutflowers at harvest of chrysanthemum cv. Reagan series. The longest stem length of cutflowers were obtained from plants applied with 80-80-80 kgs NPK/ha + Osmocoted 14-13-13 at 60g/sq. m. which had a mean of 66.67 cm. comparable to the plants applied with 80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40 g/sq. m. with a mean of 66 cm. , 80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 20g / sq. m. having a mean of 65.67 cm. Shortest stem length ofcutflowers were obtained from the plants with no fertilizer application at harvest with a mean of 50.67.

Table 6. Stem length of cutflowerat harvest (cm)

TREATMENT	MEAN (cm)
No fertilizer application	50.67c
Osmocote 14-13-13 at 20 g/sq m	52.67c
Osmocote 14-13-13 at 40 g/sq m	56.67bc
Osmocote 14-13-13 at 60 g/sq m	65.67a
80-80-80 kgs NPK/ha (recommended rate)	60.33ab
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 20 g/sq m	66.00a
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40 g/sq m	66.00a
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/sq m	66.67a

Means followed by a common letter are not significantly different at 5% level (DMRT)

Number of Flowers per Stem

Table 7 shows that there were significant differences obtained on the application of thedifferent rates of Osmocote 14-13-13 with regards to the number of flowers per stem. Application of 80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/ sq. m. enhanced the development of more flowers per stem with a mean of 15.33 comparable to the plants per stem with a mean of 15.22 Plants produced the lowest numbers of flowers per stem was obtained from plants applied with the recommended rate (80-80-80 kgs NPK/ha) which had a mean of only 9.67.

Table 7. Number of flowers per stem

TREATMENT	MEAN
No fertilizer application	11.11bc
Osmocote 14-13-13 at 20 g/sq m	12.33abc
Osmocote 14-13-13 at 40 g/sq m	14.67ab
Osmocote 14-13-13 at 60 g/sq m	11.33bc
80-80-80 kgs NPK/ha (recommended rate)	9.67c
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 20 g/sq m	15.22a
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40 g/sq m	10.00c
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/sq m	15.33a

Means followed by a different letters are significantly different at 5% level (DMRT)

Number of Cutflowers per 1x10 m plot (doz)

With regards to the number of cutflowers per 1x10 m plot, there were significant effects on the application of different rates of Osmocote 14-13-1. The highest number of cutflowers per 1x10m plot was produced in plants treated with 80-80-80 kgs NPK/ha + Osmocote14-13-13 at 60 g/ sq. m. with a mean of 32.75 dozens as shown in table 8. This was followed by the application of 80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40 g/ sq. m. with mean of 30.82 dozens which was comparable with the plants applied with Osmocote 14-13-13 at 60 g/ sq. m. which had a mean of 30.75 dozens. The least number of cutflower harvested per 1x10 m plot were obtained from the plants with no fertilizer applicationwith a mean of 26.85 dozens only.

Table 8. Number of cutflowers per 1x10 m plot (doz)

TREATMENT	MEAN (doz)
No fertilizer application	26.85c
Osmocote 14-13-13 at 20 g/sq m	29.34bc
Osmocote 14-13-13 at 40 g/sq m	29.55bc
Osmocote 14-13-13 at 60 g/sq m	30.75ab
80-80-80 kgs NPK/ha (recommended rate)	29.56bc
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 20 g/sq m	27.40c
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40 g/sq m	30.82ab
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/sq m	32.75a

Means followed by a common letter are not significantly different at 5% level (DMRT)

Flower Diameter at Full Bloom Stage

Table 9 shows that significantly bigger blooms were measured from plants applied with 60g/sq. m. Osmocote 14-13-13 only with a mean of 8.27 cm. at full bloom stage. Likewise, plants applied with the recommended rate only at 80-80-80 NPK/ha had also big blooms which measured 8.23 cm. across. The smallest blooms were obtained from the plants with no fertilizer application with a mean of 7.30 cm.

Table 9.Flower diameter at full bloom stage (cm)

TREATMENT	MEAN (cm)
No fertilizer application	7.30b
Osmocote 14-13-13 at 20 g/sq m	7.53ab
Osmocote 14-13-13 at 40 g/sq m	7.43b
Osmocote 14-13-13 at 60 g/sq m	8.27a
80-80-80 kgs NPK/ha (recommended rate)	8.23a
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 20 g/sq m	8.00ab
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40 g/sq m	7.97ab
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/sq m	8.30a

Means followed by a common letter are not significantly different at 5% level (DMRT)

Vaselife

Application of different rates of Osmocote 14-13-13 had also affected the vaselife of chrysanthemumcutflowers cv. Reagan series as shown in table 10. Cutflowers harvested from plants applied with 80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/ sq. m. had the longest vaselife which had a mean of 17.0 days compared to other treatments including the untreated plants with just a mean of 14 days.

Table 10.Vaselife (days)

TREATMENT	MEAN
No fertilizer application	14.00b
Osmocote 14-13-13 at 20 g/sq m	14.33b
Osmocote 14-13-13 at 40 g/sq m	15.00b
Osmocote 14-13-13 at 60 g/sq m	15.33b
80-80-80 kgs NPK/ha (recommended rate)	14.67b
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 20 g/sq m	14.33b
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40 g/sq m	14.67b
80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 60 g/sq m	17.00a

Means followed by a common letter are not significantly different at 5% level (DMRT)

Occurence of Insect Pest and Diseases

The cutflowers were sprayed with fungicide on the first sign of white rust and were also sprayed with insectide on the first emergence of aphids. This was done once a week to prevent any damages on the cutflower and to ensure good quality.

Soil Analysis

Table 12 shows the results of initial soil analysis prior to application of the different fertilizer treatments. Results show that the soil pH is 6.51 which is within the pH requirement for chrysanthemum which is 6.0 to 6.5; organic matter (OM) content of 3.0% ; Initial phosphorus (P) is at 108.0; and Potassium (K) at 342.0.

Meteorological Data

Table 13 shows that the highest volume of rainfall was recorded in the month of February 2012 with 3.40 mm and the highest relative humidity of 90.00%. The driest month was in December 2011 with only 0.72 mm rainfall; while the lowest relative humidity of 83.63% was obtained in January, 2012. Maximum average temperature of 13.10^0C was recorded in the month of January, 2012.

Table 12.Soil Analysis

	pH	OM (%)	Phosphorus P (ppm)	Potassium K (ppm)
Initial soil analysis	6.51	3.0	108.0 3	42.0

Table 13.Meteorological data for the cropping period.

Month	Rainfall	RH(%)	Temperature (^{0}C)		Sunshine Duration (hrs)
			max	min	
Dec. 2011	0.72	86.90	24.48	14.48	3.80
Jan. 2012	1.40	83.63	24.15	13.10	4.95
Feb. 2012	3.40	90.00	24.10	14.60	5.07
March 2012					

Cost and Return Analysis

Table 13 and Table 14 shows the economics of using Osmocote 14-13-13 applied singly in different rates of 20, 40 and 60 g/sq. m. or in combination with 80-80-80 kgs NPK/ha (recommended rate)

Results show that the highest gross income of Php 25,680.00 in a 100 sq. m. greenhouse area was realized with the application of 60g/ sq. m. Osmocote 14-13-13 + 80-80-80 NPK/ha (Recommended rate) with a net income of PhP 9,885.7 ROI (Return on Investment) of 62.59% and rank 1. This was followed by the application of 80-80-80 NPK/ha + Osmocote 14-13-13 at 40 g/sq. m. with a net income of 24,040.00 a net income of Php 8,825.7; ROI of 58.00% and ranked 2.

A negative net income was obtained from the plants with no fertilizer application due to lower cutflower quality of harvest and consequently with lower market price.

Table 13. Cost and Return analysis for a 100 sq. m area of chrysanthemum cutflower production under greenhouse condition.

Treatment	Gross Income (Php)	Cost of Production (Php)	Net Income (Php)	Return on Investment ROI%	Rank
No fertilizer application	12,750.00	13,900	-1,150	-8.27	8
Osmocote 14-13-13 at 20 g/sq. m.	17,010.00	14,480	2,530	17.47	6
Osmocote 14-13-13 at 40 g/ sq. m.	17,070.00	15,060	2,010	13.34	7
Osmocote at 60 g/ sq. m.	24,040.00	15,640	8,400	53.70	3
80-80-80 NPK/ha (RR) (RR)	22,840.00	14,054	6,565.7	46.71	4
80-80-80 NPK/ha + Osmocote 14-13-13 at 20 g/ sq. m.	21,200.00	14,634.3	6,565.7	44.86	5
80-80-80 NPK/ha + Osmocote 14-13-13 at 40 g/ sq. m.	24,040.00	15,214.3	8,825.7	58.00	2
80-80-80 NPK/ha + Osmocote 14-13-13 at 60 g/ sq. m.	25,680.00	15,794.3	9,885.7	62.59	1

Table 14. Cost of Production for one cropping 100 sq. m. area.

Treatment	Planting Materials	Labor (Php)	Wire mesh	Sprays (Php)	Lighting (Php)	Fertilizer Trt	Total
No fertilizer application	2300	7200	600	1200	2600		13,900
Osmocote 14-13-13 at 20 g/ sq. m.	2300	7200	600	1200	2600	580	14,480
Osmocote 14-13-13 at 40 g/ sq. m.	2300	7200	600	1200	2600	1,160	15,060
Osmocote 14-13-13 at 60 g/ sq. m.	2300	7200	600	1200	2600	1,740	15,640
80-80-80 NPK/ha (RR) (RR)	2300	7200	600	1200	2600	154.0	14,054
80-80-80 NPK/ha + Osmocote 14-13-13 at 20 g/ sq. m.	2300	7200	600	1200	2600	734.30	14,634.3
80-80-80 NPK/ha + Osmocote 14-13-13 at 40 g/ sq. m.	2300	7200	600	1200	2600	1,314.30	15,214.3
80-80-80 NPK/ha + Osmocote 14-13-13 at 60 g/ sq. m.	2300	7200	600	1200	2600	1,894.30	15,794.3

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

This study was conducted to evaluate the efficacy of Osmocote 14-13-13 on the vegetative growth, reproductive growth, cutflower quality and cutflower yield; and compare the effect of various fertilizer treatment with that of the recommended rate and to determine the economics of 14-13-13 in chrysanthemum cutflower production under La Trinidad, Benguet condition

Rooted choot tip cuttings of spray chrysanthemum Cv. Reagan Series were grown under plastic roofed greenhouse and applied with Osmocote 14-13-13 at 20, 40, and 60 g/sq. m. applied singly or in combination with 80-80-80 NPK/ha (recommended rate).

Result shows that significantly taller plants with higher number of leaves and thicker stems were measured and counted from plants applied with20, 40, 60 g/sq. m. Osmocte + the recommended rate of 80-80-80 kgs NPK/ha; and those applied with 60 g/ sq. m. Osmocote 14-13-13 only.

Earlier flowering and flower development were however, recorded in the control (untreated) while significantly delayed flowering ad flower development were observe in palnts applied with the highest rates of osmocote 14-13-13 , 80-80-80 kgs NPK/ha (recommended rate) and in higher rates of Osmocote 14-13-13 applied in combination with the recommended rate of fertilizer application due to longer vegetative growth.

Shorter plants with lesser leaf counts, thinner stems were recorded in the control (untreated). Significantly higher number of bigger flowers per stem were counted and measured from plants applied with 60g/ sq. m. Osmocte 14-13-13 + 80-80-80 kgs NPK/ha

and in plants applied with osmocote only at 60g/ sq. m. smallest blooms were measured from the control.

The highest gross income of Php 25,680.00 in a 100 sq. m. were obtained from Osmocote 14-13-13at 60g/sq. m. + 80-80-80 kgs/ NPK/ha (recommended rate)with a net income of Php 9,885.7 and an ROI of 62.59% and ranked 1. Followed by 80-80-80 kgs NPK/ha + Osmocote 14-13-13 at 40g/sq. m. ranked 2; Osmocote 14-13-13 at 60g/sq. m. ranked 3; and 80-80-80 kgs NPK/ha ranked 4.

Conclusion

Application of higher rates of Osmocte 14-13-13 in combination with the recommended rate of 80-80-80 kgs NPK/ha promoted the production of taller plants with higher leaf count, thicker stems, higher number of flower per stem which were significantly bigger, higher volume of a long cutflowers and a higher Return on Investment (ROI) 62.59%.

Recommendation

Based on the result of the study, application of Osmocte 14-13-13 at 60 g/ sq. m. is recommended to be used in chrysanthemum cutflower production in addition to the recommended rate of 80-80-80 kgs NPK/ha to improved cutflower quality and to obtained high ROI 62.59%.

LITERATURE CITED

BAUTISTA, O. K., H. V. VALMAYOR, P. C. TABORA, JR., R. C. ESPINO and J. S. SANGALANG. 1983. Introduction to Tropical Horticulture. University of the Philippines at Los Baños College, Los Baños, Laguna. Pp. 231.

BUYAS, N. A. 1994, Effects of organic and inorganic fertilizer on the growth and flowering of English daisy (*Bellis perensis*). Unpublished BS Thesis. Benguet State University, La Trinidad, Benguet. P. 26.

DAY-A, S. M. 1990. Growth, Flowering and Yield of chrysanthemum as affected by slow release Fertilizer. BS Thesis. BSU, La Trinidad, Benguet. P.9.

EMMUND, J. ., F.S. ANDREWS and T.L. SENN. 1967. Fundamentals of Horticulture. New York: McGraw Hill Book Co., Inc. P. 197.

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

FRENCH, L. B. and R. L. ALSBURG. 1989. Comparison of controlled fertilizer for the production of rhododendron 'Anna Rare Whitney' Hot. Sci. 15: 91-93.

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

JOINER, J. 1982. Foliage Plant Production: New Jersey: Prentice Hall. P. 164.

LAMONT, G. P., G. C. CRESSWELL and G. J. GRIFFITH. 1996. Nutritional Study of Christmas bell. Hort. Sci. 25: 104- 105.

MANGOBA, P.D. 1995. Varietal Evaluation of Chrysanthemum under Benguet condition. BS Thesis. Benguet State University La Trinidad, Benguet. Pp. 1-66

MCDANIEL, G.L. 1982. Ornamental Horticulture. 2nd ed. Prentice Hall. Inc. USA. Pp. 73-75.

MENDIOLA, N. B. 1976. Principles of Crop Production in Southeast Asia. Institute of Agriculture, Araneta University: United Circulation, Inc. P. 71.

PEER, J. 1996. How to Grow with Scotts Product. Scotts Co. Makati, Metro Manila. P. 6.

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

WATTS, R. L. 1972. Vegetable Gardening. New York: Orange Jude Pub., Co. Pp. 158, 511.