

IMPACT OF ORGANIC MANURE EXTRACTS ON GROWTH AND FLOWERING ASPECTS OF CHRYSANTHEMUM MORIFOLIUM CV. ICECAP PLANTS

A. I. Al- Qubaie

Dept. of Arid Land Agric., Fac. of Meteorology Environment & Arid Land Agric., King Abdulaziz Univ., Jaddah, Kingdom of Saudi Arabia.
faissalfadel@yahoo.com

(Received: Aug. 5, 2012)

ABSTRACT: *The effect of using inorganic N in combination with extracts of three organic fertilizers namely compost, farmyard manure (F.Y.M) and chicken manure at 10 to 20 % on growth, flowering and leaf chemical composition of Chrysanthemum morifolium cv. Icecap plants was investigated during 2008 and 2009 seasons.*

Inorganic fertilization alone or in combination with spraying the three inorganic extracts (compost, F.Y.M and chicken manure) at 10 to 20 % considerably stimulated all growth characters (plant height, stem diameter and number of branches per plant) and herb dry weight, number of flowers/ plant, diameter and dry weight of flower, plant pigments, sugars and uptake of N, P and K in relative to the check treatment. Inorganic N fertilization plus spraying the extracts of organic manures was superior than using inorganic N alone in enhancing such parameters. Flowering date was greatly advanced with supplying the plants with inorganic N alone or in combination with spraying extracts of these organic manures in relative to the control treatment. Increasing extracts concentrations from 10 to 20 % resulted in an obvious promotion on such aspects. The best organic manure extract in this respect was chicken manure followed by compost.

For promoting growth and flowering aspects of Chrysanthemum morifolium cv. Icecap plants, it is advised to fertilize the plants with 2.0 g ammonium sulphate/ plant plus spraying chicken manure extract at 20 % three times. During 2007 and 2008 seasons, canes of Dracaena fragrans Massangeana (corn plant) were placed in coolers at 40 °F (4.4 °C), 50 °F (10 °C), 60 °F (15.6 °C) or 70 °F (21.1 °C) and held for 2, 4, 6 or 8 weeks. A control treatment (unstored canes) was placed immediately in propagation. Canes stored at temperatures ranging from 40 °F (4.4 °C) to 70 °F (21.1 °C) for two weeks sprouted and rooted without problems but canes stored at 40 °F (4.4 °C) for more than two weeks failed to root than cane stored at other temperatures. When comparison was made between canes planted immediately or after storage for up to 8 weeks at 70 °F (21.1 °C), rooting was improved and shoot growth reduced on stored canes when propagated for the same time length.

For promoting growth and flowering aspects, of Chrysanthemum cv. Icecap plants, it is advised to fertilize the plants with 2.0 g ammonium sulphate/ plant plus spraying chicken manure extract at 20 % three times during the growing period.

Key words: *Chrysanthemum cv. icecap plants, organic fertilizers, growth and flowering aspects*

INTRODUCTION

Chrysanthemum morifolium plants are of the most important ornamental crops used in out- door and interior landscapes. Dendranthema grandiflora, Tzvelev, Formally *Chrysanthemum morifolium*, Ramat Family (Asteraceae) is considered the most desirable of all autumn blooming perennials for borders, containers and cut flowers and varied of all Chrysanthemum species available in many flower forms, colors and

growth habits.

Adding organic fertilizers not only increase the organic matter in the soil but also enhance all nutrients through their effect on lowering soil pH (Nijjar, 1985). Organic fertilizers or their extracts were beneficial in increasing soil organic matter, biological cycles, soil fertility, natural hormones (GA3, IAA and cytokinins) and vitamins B (Yagodin, 1990). The stimulation on carbohydrates due to promoting Mg availability and plant

pigments in response to organic fertilization surely reflected on enhancing flowering aspects.

Previous studies showed that inorganic and organic fertilization of horticultural crops was accompanied with enhancing growth and flowering aspects as well as nutritional status of the plants (Jacoub, 1999; Mohamed *et al.*, 2007; El- Maadawy, 2007; El- Leithy *et al.*, 2007; Abdelaziz *et al.*, 2007; Helmy and Ramadan, 2008; Ossom *et al.*, 2009; Abdalla, 2009; Abdou *et al.*, 2009; Ahmed and Jabeen, 2009; Biasi *et al.*, 2009; Mohamed *et al.*, 2009; Ashour, 2010; El- Aref *et al.*, 2011 and Hussain, 2011).

This study was carried out for examining the effect of spraying some organic manure extracts on growth, flowering and nutritional status of *Chrysanthemum morifolium* cv. Icecap.

MATERIALS AND METHODS

This study was conducted during 2008 and 2009 seasons on the experimental Farm of King Abdulaziz Univ. at Hoda Al- Sham that located about 120 km northeast of Jaddah, Saudi Arabia.

Uniform 10- cm long terminal cutting of *Chrysanthemum morifolium* cv. Icecap were planted in 10- cm pots filled with a medium containing 1 sand (1/2 kg): 1 peat moss (1/2 kg) on last week of May during both seasons. Two months later, the seedlings were transplanted into 25 cm- pots filled with the same medium. Two weeks later the plants were pinched once to induce branching.

This experiment included the ten following treatments:

- 1- Unfertilization with N.
- 2- Fertilization with 4 g ammonium sulphate/ plant.
- 3- Fertilization with 2 g ammonium sulphate/ plant.
- 4- Fertilization with 1 g ammonium sulphate/ plant.
- 5- Fertilization with 1 g ammonium sulphate/

- 6- plant + spraying compost extract at 10 %.
- 7- Fertilization with 1 g ammonium sulphate/ plant + spraying farmyard manure extract at 10 %.
- 8- Fertilization with 1 g ammonium sulphate/ plant + spraying chicken manure extract at 20 %.
- 9- Fertilization with 2 g ammonium sulphate/ plant + spraying compost extract at 20 %.
- 10- Fertilization with 2 g ammonium sulphate/ plant + spraying farmyard manure extract at 20 %.
- 11- Fertilization with 2 g ammonium sulphate/ plant + spraying chicken manure extract at 20 %.

Chemical analysis of the different compost extracts were chemically estimated before their dilutions and applications (Table, 1).

Each treatment was replicated three times, five pots per each. Inorganic N, P and K fertilizers were divided into three equal batches and were added at one month intervals starting one month after transplanting. Extracts were prepared by adding the amount of each fertilizer in water for three days. Organic manure extracts were sprayed thrice at one month intervals starting one month from transplanting. Triton B as a wetting agent at 0.05 % was added at all manure extracts before spraying. The plants received the manure extracts solutions till runoff. Control plants were sprayed with distilled water containing Triton B. complete randomize design was followed.

The selected plants received all horticultural practices that are followed in the field.

At the end of experiment, plant height (cm.), stem diameter (cm.), number of branches per plant, herb dry weight (g.), flowering date (No. of days from transplanting to first flower opening of each plant), number of flowers per plant as well as flower diameter and flower dry weight were recorded.

Table (1): Chemical analysis of organic fertilizer extracts:

Fertilizer	N %	P %	K%
F.Y.M	66	0.44	1.11
Compost	1.22	0.98	1.92
Chechen	2.11	1.12	2.34

Impact of organic manure extracts on growth and flowering aspects of

The photosynthesis pigments (chlorophyll a, chlorophyll b and carotenoids) were determined in the basal fresh leaves according to the method described by Fadl and Seri El-Deen (1978). These leaves were taken after two weeks from the last spray of manures spray.

Reducing and total soluble sugars contents were determined in the dry leaves by the methods of Nelson (1944) and Somogy (1952).

Percentages of N, P and K on dry weight basis of the leaves were determined (according to Chapman and Pratt, 1965) and uptake of each element was measured by multiplying dry weight of plant by percentage of each element.

The obtained data were statistically analyzed (Mead *et al.*, 1993) and the new L.S.D test was followed to compare between various treatment means.

RESULTS AND DISCUSSION

1- Growth characters:

Data in Table (2) show that fertilization of plants with ammonium sulphate at 1 to 4 g/ plant alone or in combination with spraying the extracts of the three organic manures (compost, F.Y.M and chicken manure) at 10 – 20 % significantly was followed by great promotion on these growth characters in relative to the control treatment (unfertilization). Increasing ammonium sulphate levels from 1 to 4 g/ plant caused a significant and gradual promotion on these growth traits. Combined application of ammonium sulphate and spraying the three organic manure extracts was preferable than using ammonium sulphate alone in this respect. Increasing concentrations of organic manure extracts from 10 to 20 % significantly caused a gradual promotion on such aspects. The best results with regard to growth characters were recorded with spraying farmyard manure extract, compost extract and chicken manure extract, in ascending order. Supplying the plants with 2 g ammonium sulphate/ plant and spraying chicken manure extract at 20 % three times effectively maximized these growth aspects. Unfertilized plants gave the lowest values. These results were true during both seasons.

The beneficial effect of organic manures on enhancing soil fertility and amending the plants with natural hormones and vitamins B could result, in enhancing these growth characters (Nijjar, 1985).

These results are in agreement with those obtained by Abdalla (2009); Abdou *et al.*, (2009); Ahmed and Jabeen (2009); Ashour (2010) and Hussain (2011).

2- Herb dry weight:

It was significantly improved with fertilization the plant with ammonium sulphate at 1 to 4 g/ plant either alone or in combination with foliar application of the three organic fertilizer extracts at 10 to 20 % in relative to the check treatment. The promotion was associated with increasing ammonium sulphate levels and concentrations of the three organic manures from 10 to 20 %. Application of ammonium sulphate combined with spraying organic manure extracts was favourable in enhancing herb dry weight comparing with using ammonium sulphate alone. Using farmyard manure extract, compost extract and chicken manure extract, in ascending order was very effective in enhancing herb dry weight. The maximum values were recorded with supplying the plants with 2 g ammonium sulphate/ plant plus spraying chicken manure extract at 20 %. Unfertilization was responsible for producing the lowest values. Similar results were announced during both seasons Table (2).

The promoting effect of organic fertilization on growth and nutritional status of the plants surely reflected on promoting herb dry weight.

These results are in agreement with those obtained by Abdalla (2009); Abdou *et al.*, (2009); Ahmed and Jabeen (2009); Ashour (2010) and Hussain (2011).

3- Flowering aspects:

Data in Table (3) clearly show that fertilization with ammonium sulphate at 1 to 4 g/ plant alone or combined with foliar application of the three organic manures extracts at 10 to 20 % significantly advanced flowering date and improved number of flowers per plant as well as diameter and dry weight of flower in relative to unfertilization.

Table 2

Impact of organic manure extracts on growth and flowering aspects of

Table 3

The promotion was associated with increasing levels of ammonium sulphate and concentrations of each manure extracts from 10 to 20 %. Combined application of ammonium sulphate plus foliar application of organic manure at 10 to 20 % was superior than using ammonium sulphate alone. Using chicken manure extract was superior than using the other organic manure extracts in this respect. The maximum values were recorded with using ammonium sulphate at 2 g/ plant plus foliar application of chicken manure extract at 20 %. Unfertilization gave the lowest values. These results were true during 2008 and 2009 seasons.

The beneficial effects of organic fertilization on growth, plant pigments and sugar, surely reflected on enhancing flowering aspects.

These results are in approval with those obtained by El- Maadawy (2007); Mohamed *et al.*, (2009); Ashour (2010) and Hussain (2011).

4- Plant pigments:

Data in Table (4) show that fertilization of plants with ammonium sulphate at 1 to 4 g/ plant alone or in combined with foliar application of the three organic manure extracts at 10 to 20 % significantly stimulated plant pigments namely chlorophylls a & b and total carotenoids in relative to unfertilization. The promotion was in proportional to increasing levels of ammonium sulphate and concentrations of manure extracts from 10 to 20 %. Application of chicken manure extract gave the best results followed by compost extract and farmyard manure extract ranked the last position. Supplying the plants with ammonium sulphate at 2 g/ plant besides foliar application of chicken manure extract at 20 % gave the best results. The minimum values were recorded on unfertilized plants. These results were true during both seasons.

The beneficial effects of organic fertilization on enhancing growth, uptake of Mg, N and K and sugars surely reflected on enhancing plant pigments biosynthesis.

These results are in approval with those obtained by El- Maadawy (2007); Mohamed *et al.*, (2009); Ashour (2010) and Hussain (2011).

5- Reducing and total soluble sugars:

It is clear from the data in Tables (4 & 5) that supplying the plants with ammonium sulphate at 1 to 4 g/ plant alone or in combined with spraying different manure extracts at 10 to 20 % significantly was accompanied with enhancing reducing and total soluble sugars in relative to unfertilization. The increase on these sugars was in proportional to the increase in ammonium sulphate levels and concentrations of manure extracts from 10 to 20 %. The promoting effect on sugars was attributed to using farmyard manure extract, compost extract and chicken manure extract, in ascending order. The highest values were recorded with supplying ammonium sulphate at 2 g/ plant plus spraying chicken manure extract at 20 %. The lowest values were recorded on untreated plants (unfertilization). Similar results were announced during both seasons.

The beneficial effect of organic fertilization on enhancing plant pigments and photosynthesis process surely reflected on enhancing sugars.

These results are in approval with those obtained by El- Maadawy (2007); Mohamed *et al.*, (2009); Ashour (2010) and Hussain (2011).

6- Uptake of N, P and K:

It is worth to mention that supplying the plants with ammonium sulphate at 1 to 4 g/ plant either singly or in combination with spraying manure extracts at 10 to 20 % significantly increased uptake of N, P and K in relative to the control treatment. There was a gradual and significant promotion on uptake of these nutrients with increasing levels of ammonium sulphate and concentrations of organic manure extracts. Using ammonium sulphate plus spraying organic manure extracts at 10 to 20 % was essential in enhancing uptake of these nutrients rather than application of ammonium sulphate alone. The maximum values were detected with supplying the plants with ammonium sulphate at 2 g/ plant plus spraying the plants with chicken manure at 20 %. The lowest values were recorded with unfertilization treatment. These results were true during both seasons.

Impact of organic manure extracts on growth and flowering aspects of

Table 4

Table5

Impact of organic manure extracts on growth and flowering aspects of

The beneficial effects of organic fertilization on lowering soil pH as well as increasing organic matter and soil fertility surely reflected on enhancing uptake of nutrients (Nijjar, 1985).

These results are in approval with those obtained by El- Maadawy (2007); Mohamed *et al.*, (2009); Ashour (2010) and Hussain (2011).

As a conclusion, for promoting growth, flowering and nutritional status of *Chrysanthemum* cv. Icecap, it is advised to fertilize the plants with ammonium sulphate at 2 g/ plant plus treating the plants thrice with chicken manure extract at 20 %.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to the staff members of Hoda Al-Sham Agricultural Research Station K.A.U especially Prof. Dr. Abdel- Moneam El-Tokhy for his assistance and patience during the collection of samples of this work.

REFERENCES

- Abdalla, M. Y. A. (2009). Effect of organic, bio-and mineral fertilization on growth, yield, oil productivity and chemical constituents of coriander plant. *J. Agric. Sci., Mansoura Univ.* 34 (5): 5195 – 5208.
- Abdelaziz, M., R. Pokluda and M. Abdelwahab (2007). Influence of compost, microorganisms and NPK fertilizer upon growth, chemical composition and essential oil production of *Rosmarinus officinalis*, L. *Not - Bot - Hort. Agrobot. Cluj*, 2007 Volume 35, Issue 1 Print ISSN 0255 - 965 x; Electronic ISSN 1842 – 4309. D. 86 – 90.
- Abdou, M. A. H., M. K. Aly, K. A. Zaki, A. A. Sadek and R. El-Husseiny (2009). Response of borage plants to some organic and biofertilization treatments. The 5th Inter. of Sustain, Agric. and Develop., Fac. of Agric., Fayoum Univ., 21 - 23 December.
- Ahmad, R. and A. Jabeen (2009). Demonstration of growth improvement in sunflower (*Helianthus annuus*, L.) by the use of organic fertilizers under saline conditions. *Pak. J. Bot.*,41 (3): 1373 – 1384.
- Ashour, R. M. I. (2010). Response of jojoba plants to some organic and biofertilization treatments. Ph. D. Thesis, Fac. of Agric., Minia Univ.
- Biasi, L. A., E. M. Machado, A. P. Kowalski, D. Signor, M. A. Alves, F. I. Lima, C. Deschamps, L. C. Cocco and A. Scheer (2009). Organic fertilization in the production, yield and chemical composition of basil chemotype eugenol. *Horticultura Brasileira.* 27 (1): 35-39. [J. article. ISSN : 0102 – 05361].
- Chapman, H.D. and P.F. Pratt (1965). *Methods of analysis of Soils, Plant and Water*, Calif. Univ., Division of Agric. Sci., pp: 172- 173.
- El- Aref, Kh, A. O., A. S. A. Abo El- Hamd and A. M. A. Abd El- Monem (2011). Influence of filter mud cake fertilization under low levels of nitrogen on yield and its components for two sunflower cultivars. *J. of Plant Production, Mansoura Univ.* 2 (2): 165 – 178.
- El- Leithy, AS., S. H. M. El- Hanafy, G. E. Ahmed, M. A. Etman and M. Y. M. C. Ali (2007). Effect of compost, bio-fertilizer and active dry yeast of *Origanum syriacum*, L. plants under Sinai conditions. *J. Product. & Dev.* 12 (1): 153-171.
- El- Maadawy, E. I. (2007). Response of summer annual flowering plants to chemical, organic and bio-fertilization treatments. 11- African marigold (*Tagetes erecta*, L.) plants. *J. Product. & Dev.*, 12 (1):173 – 199.
- Fadl, M. S. and S. A. Seri El- Deen (1978). Effect of N Benzyl adenine on photosynthesis pigments total sugars on olive seedling growth under saline condition, *Res. Bull. No. 843, Fac. Agric. Ain shams Univ.*
- Helmy, A. M. and M. F. Ramadan (2008). Physiological and chemical response of sunflower to some organic nitrogen sources and conventional nitrogen fertilizers under sandy soil conditions. *Zagazig J. Agric. Res.*, 35 (2): 315-341.
- Hussain, M. A. (2011). Effect of chemical, organic and biofertilization treatments on moghat (*Glossostemon bruguieri*, Desf.) plants. Ph. D. Thesis, Fac. of Agric., Minia Univ., Egypt.
- Jacob, R. W. (1999). Effect of some

- organic and non-organic fertilizers on growth, oil yield and chemical composition of *Ocimum basilicum*, L. and *Thymus vulgaris*, L. plants. Ph. D. Thesis, Fac. of Agric., Cairo Univ., Egypt.
- Mead, R., R. N. Curnow and A. M. Harted (1993). *Statistical Methods in Agricultural and Experimental Biology*. Second Ed. Chapman & Hall London. pp 10 - 44.
- Mohamed, M. A., A. Ayman and A. Mohamed (2009). The effect of bio, organic and mineral fertilization on productivity of sunflower seeds and oil yields. *J. of Agric. Res. Kafer El-Sheikh Univ.* 35 (4): 1013 – 1029.
- Mohamed, M. A., E. H. Fayed, S. A. E. Mowafy and Z. Nehal- El-Naggar (2007). Effect of organic manuring, planting density and N fertilization levels on yield and its relation to photosynthate partitioning parameters of sunflower using drip irrigation system under sandy soil conditions. *Zagazig J. of Agric. Res.*, 34 (6): 1039 – 1074.
- Nelson, N. (1944). A photometric adaptation of somogyi methods for determination of glucose. *J. Bio. Chem.* 153, pp 375 – 380.
- Nijjar, G. S. (1985). *Nutrition of Fruit Trees*. Published by Mrs Usha Raj Kumar for kalyani, New Delhi pp. 283-302.
- Ossom, E. M., R. L. Rhykerd and C. T. Fwala (2009). Influence of filter cake on agronomic characteristics of cassava (*Manihot esculenta* Crantz) in Swaziland. *World J. Agric. Sci.* 5 (2): 228 – 236.
- Somogy, M. (1952). Notes on sugar determination. *J. Bio. Chem.* 195 pp 19 – 23.
- Yagodin, B. A. (1990). *Agricultural Chemistry*. Mir Publishers, Moscow, pp. 278-281.

"تأثير مستخلصات الأسمدة العضوية على صفات النمو والأزهار في نباتات الأراولة"

صنف أيس كاب"

أحمد إبراهيم القبلي

كلية الأرصاد والبيئة وزراعة المناطق الجافة - جامعة الملك عبد العزيز - جدة - المملكة العربية السعودية.

الملخص العربي

تم دراسة تأثير استخدام السماد النيتروجيني الغير عضوى مع رش مستخلصات بعض الأسمدة العضوية وهي الكمبوست والسماد البلدى وسماد زرق الدواجن بتركيز ما بين 10 إلى 20 % على النمو والأزهار والتركيب الكيماوى للورقة في نباتات الأراولة صنف أيس كاب خلال موسمي 2008، 2009.

أدى استخدام النيتروجين الغير عضوى بمفرده أو مع رش مستخلصات الأسمدة العضوية الثلاثة بتركيز ما بين 10 إلى 20 % إلى تحسين جميع صفات النمو الخضرى (ارتفاع النبات - سمك الساق وعدد الأفرع للنبات) كذلك وزن العشب الجاف وعدد الأزهار للنبات وقطر ووزن الزهرة والصيغات النباتية والسكريات وامتصاص النبات لعناصر النيتروجين والفوسفور والبوتاسيوم وذلك بالمقارنة بعدم التسميد (معاملة المقارنة) وكان التسميد الغير عضوى مع رش مستخلصات الأسمدة العضوية أفضل من استخدام السماد الغير عضوى فقط في تحسين هذه المقاييس وكان هناك تكبير في موعد الأزهار مع تسميد النباتات بالسماد الغير عضوى فقط أو مع رش الأسمدة العضوية الثلاثة وقد أدى زيادة التركيز المستخدم من هذه الأسمدة من 10 إلى 20 % في حدوث تحسن واضح في هذه الصفات. وكان أفضل مستخلص وهو مستخلص زرق الدواجن يليه في هذا الصدد مستخلص الكمبوست.

لأجل تحسين خصائص النمو الخضرى والزهرى لنباتات الأراولة صنف ايس كاب فإنه ينصح بتسميد النباتات بسماد سلفات الأمونيوم بمعدل 2 جرام للنبات مع رش مستخلص زرق الدواجن بتركيز 20 % ثلاثة مرات.

Table (2): Effect of spraying some organic manure extracts on some growth characters and herb dry weight of *Chrysanthemum morifolium* cv. Icecap plants during 2008 and 2009 seasons.

Treatment	Plant height (cm.)		Stem diameter (mm)		Number of branches per plant		Herb dry weight (g.)	
	2008	2009	2008	2009	2008	2009	2008	2009
Unfertilization	60.0	61.3	5.11	5.04	5.11	5.15	16.1	16.1
4 g ammonium sulphate/ plant	64.6	65.7	5.48	5.41	5.41	5.45	16.8	16.8
2 g ammonium sulphate/ plant	64.0	65.3	5.34	5.27	5.31	5.35	16.5	16.6
1 g ammonium sulphate/ plant	62.0	63.4	5.22	5.15	5.21	5.25	16.3	16.3
1 g ammonium sulphate/ plant + spraying compost extract at 10 %	71.6	73.0	5.71	5.64	5.63	5.65	17.2	17.2
1 g ammonium sulphate/ plant + spraying F.Y.M extract at 10 %	66.7	68.0	5.60	5.53	5.52	5.55	17.0	17.0
1 g ammonium sulphate/ plant + spraying chicken manure extract at 10 %	74.6	76.0	5.86	5.79	5.74	5.77	17.5	17.6
2 g ammonium sulphate/ plant + spraying compost extract at 20 %	74.3	75.7	6.11	6.03	5.95	5.98	17.9	18.0
2 g ammonium sulphate/ plant + spraying F.Y.M extract at 20 %	69.3	70.6	5.96	5.89	5.84	5.87	17.7	17.7
2 g ammonium sulphate/ plant + spraying chicken manure extract at 20 %	67.9	78.2	6.25	5.18	6.08	6.11	18.1	18.1
New L.S.D at 5 %	1.5	1.5	0.10	0.10	0.09	0.08	0.2	0.2

Table (3): Effect of spraying some organic manure extracts on some flowering aspects of *Chrysanthemum morifolium* cv. Icecap plants during 2008 and 2009 seasons.

Treatment	Flowering date (day)		Number of flowers per plant		Flower diameter (cm.)		Flower dry weight (g.)	
	2008	2009	2008	2009	2008	2009	2008	2009
Unfertilization	185.0	184.0	23.3	23.3	6.21	6.22	0.61	0.60
4 g ammonium sulphate/ plant	179.0	178.0	27.6	26.6	6.50	6.49	0.72	0.71
2 g ammonium sulphate/ plant	181.0	180.0	26.6	25.5	6.37	6.36	0.68	0.67
1 g ammonium sulphate/ plant	183.0	182.0	24.5	23.3	6.34	6.34	0.65	0.64
1 g ammonium sulphate/ plant + spraying compost extract at 10 %	176.0	175.0	29.7	28.7	6.73	6.73	0.80	0.79
1 g ammonium sulphate/ plant + spraying F.Y.M extract at 10 %	177.0	176.0	28.7	27.7	6.61	6.61	0.75	0.74
1g ammonium sulphate/ plant+spraying chicken manure extract at 10%	174.0	173.0	30.8	29.8	6.86	6.85	0.83	0.82
2 g ammonium sulphate/ plant + spraying compost extract at 20 %	171.0	170.0	30.0	29.0	7.05	7.06	0.88	0.87
2 g ammonium sulphate/ plant + spraying F.Y.M extract at 20 %	172.0	171.0	29.0	28.0	6.92	6.92	0.85	0.84
2 g ammonium sulphate/ plant+spraying chicken manure extract at 20%	170.0	169.0	31.0	30.0	7.17	7.17	0.89	0.88
New L.S.D at 5 %	1.9	1.9	1.0	1.0	0.11	0.11	0.03	0.03

Table (4): Effect of spraying some organic manure extracts on some plant pigments and reducing sugars content of *Chrysanthemum morifolium* cv. Icecap plants during 2008 and 2009 seasons.

Treatment	Chlorophyll a (mg/ 1 /g FW)		Chlorophyll b (mg/ 1 /g FW)		Carotenoids (mg/ 1 /g FW)		Reducing sugars (mg/ 1 /g DW)	
	2008	2009	2008	2009	2008	2009	2008	2009
Unfertilization	3.02	3.03	1.05	1.06	1.22	1.25	9.11	9.15
4 g ammonium sulphate/ plant	3.31	3.32	1.29	1.30	1.40	1.43	9.66	9.70
2 g ammonium sulphate/ plant	3.21	3.22	1.20	1.21	1.34	1.37	9.50	9.55
1 g ammonium sulphate/ plant	3.11	3.11	1.12	1.13	1.28	1.31	9.36	9.41
1 g ammonium sulphate/ plant + spraying compost extract at 10 %	3.62	3.63	1.50	1.51	1.51	1.55	9.95	10.1
1 g ammonium sulphate/ plant + spraying F.Y.M extract at 10 %	3.50	3.51	1.39	1.40	1.45	1.49	9.80	9.86
1 g ammonium sulphate/ plant + spraying chicken manure extract at 10 %	3.72	3.73	1.60	1.61	1.57	1.60	10.10	10.15
2 g ammonium sulphate/ plant + spraying compost extract at 20 %	3.91	3.92	1.73	1.74	1.70	1.73	10.40	10.95
2 g ammonium sulphate/ plant + spraying F.Y.M extract at 20 %	3.81	3.81	1.66	1.67	1.64	1.67	10.25	10.30
2 g ammonium sulphate/ plant + spraying chicken manure extract at 20 %	3.96	3.97	1.80	1.82	1.75	1.79	10.55	10.60
New L.S.D at 5 %	0.05	0.05	0.06	0.06	0.04	0.04	0.13	0.13

Table (5): Effect of spraying some organic manure extracts on total soluble sugars content and uptake of N, P and K of *Chrysanthemum morifolium* cv. Icecap plants during 2008 and 2009 seasons.

Treatment	Total soluble sugars (mg. D.W)		N uptake (mg/ plant)		P uptake (mg/ plant)		K uptake (mg/ plant)	
	2008	2009	2008	2009	2008	2009	2008	2009
Unfertilization	19.11	19.20	291.0	291.2	55.2	54.2	227.0	229.0
4 g ammonium sulphate/ plant	22.20	22.29	301.0	301.5	64.0	63.1	241.0	243.0
2 g ammonium sulphate/ plant	21.14	21.23	297.0	398.0	61.0	60.0	236.0	238.0
1 g ammonium sulphate/ plant	20.11	20.20	294.0	295.0	58.0	57.0	231.0	233.0
1 g ammonium sulphate/ plant + spraying compost extract at 10 %	24.41	24.50	317.0	318.0	71.0	70.0	251.0	253.0
1 g ammonium sulphate/ plant + spraying F.Y.M extract at 10 %	23.30	23.39	311.0	312.0	66.9	65.7	247.0	250.0
1 g ammonium sulphate/ plant + spraying chicken manure extract at 10 %	25.50	25.60	325.0	326.0	75.0	74.0	255.0	258.0
2 g ammonium sulphate/ plant + spraying compost extract at 20 %	27.55	27.64	338.0	338.0	83.0	82.0	264.0	267.0
2 g ammonium sulphate/ plant + spraying F.Y.M extract at 20 %	26.50	26.60	331.0	331.0	79.0	78.1	260.0	264.0
2 g ammonium sulphate/ plant + spraying chicken manure extract at 20 %	28.60	28.70	350.0	351.0	86.0	85.0	267.0	268.0
New L.S.D at 5 %	1.00	1.01	2.9	3.0	2.0	2.0	3.0	3.0