RESEARCH RESULTS FOR FLOWER GROWERS

Lilies, Chrysanthemums and Miscellaneous Crops

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Effect of Pre- and Post- Planting Miticide Treatments on Bulb Mites and Growth of Easter Lily, *Lilium longiflorum* Thunb.

Kenneth C. Sanderson, Willis C. Martin, Jr., W. Frank McQueen and Ronald L. Shumack[1/]

Nature of Work: Limited information is available in the literature on mites occurring on Easter lily *Lilium longiflorum* Thunb. Mites have been found to be universal in occurrence in lily bulbs and revealed to destroy 15% to 20% of a bulb in shipping. Considerable confusion exists on the species of bulb mite involved, whether mite invasion is of primary or secondary nature, and the value of safe and effective control measures. The present investigation considers the effect of several miticide treatments on mite infestations and growth of Georgia Easter lily.

Results: Preplant bulb dips (15 min) of formetanate-chlorphenamidine, disulfoton, sarolex, dicofol, zinophos, and Dasanit, and postplant soil treatments of zinophos-phorate reduced bulb mite, *Rhizoglyphus callae* Oudemans, populations measured at flowering (Tables 1 and 2). Foliage injury was less on plants grown from bulbs treated with formetanate-chlorphenamidine or plants receiving no soil treatment or a soil application of disulfoton. Soil applications of Dasanit, dimethoate, disulfoton, zinophos-phorate, and zinophos yielded plants with less root rot than untreated plants. Preplant bulb dips of Dasanit, dimethoate, sarolex, or dicofol produced taller plants than untreated bulbs. Plants grown in zinophos treated soil were taller plants than either check plants or plants receiving dimethoate or dasanit. Soil applications of liquid Dasanit produced plants with fewer flowers than plants receiving soil applications of disulfoton, granular Dasanit or oxydemetonmethyl.

1/ Associate Professor and Instructor, Dept. of Horticulture and Survey Entomologist and Extension Specialist Plant Sci. Div. Extension Serv., respectively. Appreciation is extended to the following for their assistance in this research: F. F. Smith and R. L. Smiley of USDA, ARS, Beltsville, Md., and R. M. Patterson, Data Analyst, Auburn Univ. (statisti

Table 1. Effect of various preplant miticide bulb treatments on the mite control, plant condition and growth of flowering Easter lily

Treatment	Conc. per ℓ	Mite[z] control	Foliage	Root condition	Bulb rot	Ht. (cm.)	No. flowers per plant
Formetanate 30 WP & Chlorphenamidine 60 WP (EP-334 or Fundal)	781mg	0.0f[y]	0.5c	1.0cd	2.8a	47.3abc	5.9a
Disulfoton 65.7 LC (Di-Syston)	0.78ml	0.3ef	2.0ab	0.8cd	2.6a	45.5bc	5.6a
Sarolex 50 WP (Diazinon)	2,344mg	0.3ef	2.0ab	0.3d	2.6a	51.9a	5.9a
Dicofol 18.5 EC (Kelthane)	1.3ml	0.6def	1.3bc	0.5d	3.3a	50.8a	5.7a
Zinophos 4 EC	0.78ml	0.8def	2.0ab	0.8cd	1.8a	49.7ab	6.2a
Dasanit 63 SC	0.78ml	1.0def	2.8a	0.8cd	3.0a	51.1a	6.0a
Morestan 25 WP	521mg	2.3cde	2.3ab	3.3a	2.1a	45.0bc	5.1a
Demeton 26.2 EC (Systox)	1.3ml	2.3de	1.8ab	0.3d	2.5a	48.1abc	5.6a
Dimethoate 26.7 EC (Cygon)	1.3ml	2.5bcd	1.8ab	0.3d	2.0a	51.3a	5.5a
Zectran 22.3 EC	2.6ml	2.5cd	2.0ab	0.5d	3.0a	48.3abc	4.9a
Pentac 50 WP	521mg	3.1abc	3.0a	2.5abc	2.8a	44.9bc	6.0a
Malthion 5 EC	1.8ml	3.4abc	2.5ab	1.0cd	2.3a	49.1abc	5.4a
Chlorobenzilate 4 EC	1.3ml	3.8abc	2.8a	2.0a-d	2.3a	44.2c	6.0a
Oxydemetonmethyl 25.4 SC (Meta-Systox-R) .	1.3ml	3.8abc	1.3bc	0.5d	2.0a	48.0abc	5.6a
Chlorphenamidine 95 WP (EP-333 or Carzol)	781mg	4.3abc	2.3ab	1.8a-d	3.0a	45.8bc	5.3a
Check	- - -	4.5ab	1.8ab	2.0a-d	2.3a	45.2bc	5.1a
Aramite 15 WP	2,344mg	5.0a	2.3ab	2.8a	3.3a	48.6abc	5.5a

[z] Rating for mite control and plant condition: 0 = excellent and 5 = very poor.

[y] Mean separation, in columns, by Duncan's multiple range test at the 5% level.

Table 2. Effect of various miticide soil treatments on the mite control, plant condition and growth of flowering Easter lily

Treatment	Conc. ml per ℓ	Rate per 15 cm pot	Mite[z] control	Foliage	Root condition	Bulb rot	Ht. (cm.)	No. flowers per plant
Zinophos 15G and Phorate (Thimet) 7.5G	---	1.2g	0.3c[y]	3.8a	0.5b	3.6a	48.6ab	5.8bc
Dimethoate 26.7 EC	2.60	100ml	0.8bc	3.8a	0.5b	3.0a	45.4b	5.9bc
Disulfoton 10G (Di-Syston) .	---	2.1g	1.1bc	2.8abc	0.5b	1.8a	48.6ab	6.8ab
Dasinit 10G	---	1.7g	1.4abc	3.0ab	0.8b	3.4a	50.0ab	6.8ab
Dasinit 63 SC	0.78	100ml	1.8abc	2.5abc	0.5b	2.4a	44.8b	5.6c
Zinophos 4 EC	0.78	100ml	2.3abc	1.8bc	0.8b	2.8a	53.3a	6.5abc
Zectran 22.3 EC	2.60	100ml	3.8a	2.5abc	2.3ab	3.1a	49.8ab	6.1abc
Disulfoton 65.7 EC (Di-syston)	0.78	100ml	3.1ab	1.5c	1.8a	2.3a	48.3ab	6.0bc
Check	---	---	3.8a	1.5c	3.3a	2.8a	46.9b	6.2abc
Oxydemetonmethyl 25.4 SC (Meta-Systox-R)	1.30	100ml	3.8a	2.5bc	2.3ab	3.1a	49.8ab	7.2a

[z] Rating for mite control and plant condition: 0 = excellent and 5 = very poor.

[y] Mean separation, in columns, by Duncan's multiple range test at the 5% level.

Publications: Sanderson, K.C., W. C. Martin, Jr., H. Frank McQueen and Ronald L. Shumack. 1974. Effectiveness of mitecides on Lilium longiflorum Thunb. cv Georgia. Florist Review 153: 19-20, 54.

Growth Retardant Treatment Evaluations on Japanese Georgia Easter Lilies

Kenneth C. Sanderson and Willis C. Martin, Jr.

Nature of Work: Pre-cooled Japanese Georgia Easter lily bulbs were potted into soil-peat-perlite media on December 27, 1971. Prior to planting, the medium was amended with 150 g limestone and 30 g superphosphate per bu. Pots were placed in a glasshouse at a minimum night temperature of 62° F. Upon the emergence of shoots on approximately January 11 and until February 11, the plants were lighted from 10 p.m. to 2 a.m. each night using cyclic lighting. On February 25, the growth retardants listed in Table 3 were initiated. A randomized complete block design was used in applying treatments to 10 plants in 2 replications. Plant height and number of flowers per plant was recorded at flowering.

Results: CEPA treatments of 200 ppm and 100 ppm caused abortion of lily buds and records were not taken on height and flower number for these treatments. CEPA is an effective retardant on Japanese Georgia Easter lily and might be used in situations where flower buds are undesirable, e.g. bulb production. Ancymidol drenched plants exhibited stem weakening and several plant stems snapped off in handling. Ancymidol and 100 ppm CEPA drenched plants exhibited the greatest height reduction (Table 4). At the concentrations used in this experiment, CBBP every 2 weeks, NIA 10637 sprays and DPX 1820 spray had very little effect on lily height. The most number of flowers per plant was observed on plants treated with 125 - 150 ppm ancymidol sprays (Table 4). Severe reduction in flower number occurred with 100 ppm CEPA drenches and 1000 ppm NIA 10637 spray.

Publications: None.

Table 3. Growth retardant treatments used on Japanese Georgia Easter Lilies.

Treatment	Retardant[z]	Application	Amount	Concentration (ppm)
1	Check	-	-	-
2	CEPA	Single drench	240ml	100
3	CEPA	Single drench	240ml	200
4	CEPA	Single drench	240ml	400
5	CBBP	Single drench	240ml	700
6	CBBP	Drench every 2 weeks		230
7	Ancymidol	Single drench 240ml	240ml	2
8	Ancymidol	Single drench 240ml	240ml	4
9	Ancymidol	Single drench 240ml	240ml	6
10	Ancymidol	Single drench 240ml	240ml	8
11	Ancymidol	Drench every 2 weeks	240ml	2
12	Ancymidol	Single spray	-	100
13	Ancymidol	Single spray	-	125
14	Ancymidol		-	150
15	Ancymidol		-	200
16	Ancymidol	Spray 2 applications 2 weeks apart	-	50
17	NIA 10637	Single spray	-	250
18	NIA 10637	Single spray	-	500
19	NIA 10637	Single spray	-	1,000
20	DPX 1820	Single spray	-	1,250

z Retardants were CEPA (Anchem's Etherel(R) or ethephon), Ancymidol (Eli Lily's A-Rest(R), NIA 10637 (Niagara Chemical's experimental material) and DPX 1820 (Dupont's experimental material).

Table 4. Effect of various growth retardant treatments on lily height and flower number

Treatment[z]	Ht(cm)	No. flowers per plant
None	54.9	2.8
100 ppm CEPA drench	36.2	1.7
200 ppm CEPA drench	-	-
400 ppm CEPA drench	-	-
700 ppm CBBP drench every	43.6	3.2
230 ppm CBBP drench every 2 wk	49.9	3.1
2 ppm Ancymidol drench	38.3	3.0
4 ppm Ancymidol drench	28.9	2.9
6 ppm Ancymidol drench	28.2	2.8
8 ppm Ancymidol drench	26.5	2.5
2 ppm Ancymidol drench every 2 wk	31.2	3.1
100 ppm Ancymidol spray	47.3	2.9
125 ppm Ancymidol spray	47.2	3.5
150 ppm Ancymidol spray	46.7	3.3
200 ppm Ancymido- spray	42.6	3.4
50 ppm Ancymidol spray 2 applications	47.5	2.7
250 ppm NIA 10637	50.5	3.0
500 ppm NIA 10637	48.1	2.8
1,000ppm NIA 10637	49.5	1.9
1,250 ppm DPX 1820	53.1	3.0

[z] Retardants were CEPA (Amchem's Etherel(R) or ethephon), Ancymidol (Eli Lily's A-Rest(R)), NIA 10637 (Niagara Chemical's experimental material) and DPX 1820 (Dupont's experimental material).

Publications: None.

Germination of Salt and Boron Sensitive Seeds in Municipal Compost Media

Kenneth C. Sanderson

Nature of Work: Municipal compost which had been treated with (Sewage Compost) and without raw sewage (Mobile Aid) prior to 12-16 weeks composting was compared with imported German peat moss as a germination media. Compost consisted of ground paper, metal, plastic and assorted trash of the City of Mobile, Alabama. Previous work revealed the compost to contain considerable boron and heavy metals and have a high pH which was resistant to change and high soluble salts. Ten seeds of vegetables selected with reference to salt and boron tolerance were sown in the following pasteurized media: (1) Sewage Compost, (2) Mobile Aid, (3) Sewage Compost and Sand, (4) Mobile Aid and Sand, (5) Sphagnum Peat Moss and Sand, (6) Sewage Compost and Soil, (7) Mobile Aid and Soil, (8) Sphagnum Peat Moss and Soil. Germination was carried out in a greenhouse using mist and a night temperature of 70° F. Weekly records were taken on germination for 6 weeks after sowing.

Results: Sewage-compost and Mobile Aid compost did not influence the germination of vegetable species with various degrees of salt tolerance (Table 5). Rutgers tomato had poor germination in sewage-compost and Mobile Aid compost; however, peat and sand yielded much poorer germination not only with tomato but also with cabbage and radish. Considering boron tolerance, germination was more adversely affected by peat and sand media than sewage-compost or Mobile Aid compost (Table 6); however, navy bean, a boron sensitive plant, had the poorest germination in Mobile Aid compost (Tables 6 and 7). Generally, the growth of all seedlings was best in sewage-compost or Mobile Aid and soil.

Publications: None.

Table 5. Influence of sewage-compost, Mobile Aid compost- and peat-amended media on the germination percentage of vegetable species with relative salt tolerance[1/]

Media	Salt Tolerance: High	Medium			Low
	Kale 'Blue Curled Scotch'	Tomato 'Rutgers'	Tomato 'Tiny Tim'	Cabbage 'Marion Market'	Radish 'Cherry Belle'
	% Germination				
Sewage-compost	86	82	92	94	96
Mobile Aid compost	96	70	92	96	88
Sewage-compost and sand	96	92	98	84	98
Mobile Aid compost and sand	92	92	82	96	92
Peat and sand	82	68	80	74	78
Sewage-compost and soil	96	72	96	80	80
Mobile Aid compost garbage and soil . . .	98	84	90	90	90
Peat and soil	96	80	88	84	92

[1/] Relative salt tolerance from a list prepared by Berg, C. Vande. 1950. The Influence of Salt in the Soil on the Yield of Agricultural Crops. Fourth International Congress Soil Science. Trans. 1:411-413.

Table 6. Influence of sewage-compost, Mobile Aid compost- and peat-amended media on germination percentage of boron tolerant and sensitive vegetable species[1/]

Media	Tolerant: Broadbean 'Long Pod Fava'	Tolerant: Cabbage 'Marion Market'	Sensitive: Navy Bean 'White Marrowfat'
	% Germination		
Sewage-compost	80	94	92
Mobile-Aid compost	84	96	88
Sewage-compost and sand	56	84	98
Mobile Aid compost and sand	64	96	92
Peat and sand	44	74	98
Sewage-compost and soil	60	80	100
Mobile-Aid and soil	72	90	98
Peat and soil	60	84	92

[1/] Relative tolerance determined by Eaton, F. M. 1935. Boron in Soils and Irrigation Water and Its Effects on Plants with Particular Reference to San Joaquin Valley of California. U. S. Dept. Agr. Tech. Bull. 448. 131 pp.

Table 7. Influence of Garbage-Sludge-, Garbage and Peat-Amended Media on the Germination of Semitolerant Boron Species[1/]

	Sunflower 'Mammouth Russian'	Tomato 'Rutgers'	Tomato 'Tiny Tim'	Radish 'Cherry Belle'	Lima Bean 'Fordhook'
			% Germination		
Garbage-sludge	72	82	92	96	96
Garbage	74	70	92	88	88
Garbage-sludge-and sand .	92	92	98	98	88
Garbage and sand	80	92	82	92	100
Peat and sand	52	68	80	78	94
Garbage-sludge and soil .	80	72	96	80	94
Garbage and soil	94	84	90	90	82
Peat and soil	76	80	88	92	90

1/ Relative tolerance from a list prepared by Eaton, F. M. 1935. Boron in Soils and Irrigation Water and Its Effects on Plants with Particular Reference to the San Joaquin Valley of California. U. S. Dept. Agr. Tech. Bull. 448, 131 pp.

Effect of Various Growth Retardants on Christmas Cherry and Christmas Pepper

Kenneth C. Sanderson and Willis C. Martin, Jr.

Nature of Work: Christmas cherry, *Solanum pseudo-capsicum* and Christmas pepper, *Capsicum frutescens* plants in 15 cm pots were treated on August 10 with the following retardants: (1) none, (2) 5,000 ppm SADH (B-Nine) spray, (3) 100 ppm Ancymidol (A0Rest) spray, (4) 200 ppm Ethephon drench, (5) 1,679 ppm Chlormequat (Cycocel) spray, (6) 3,358 ppm Chlormequat drench and (7) 729 ppm CBBP (Phosfon) drench.

Drenches were applied at the rate of 180 ml of solution per 15 cm pot. Five drops of surfactant were added to all sprays except SADH prior to spraying until runoff.

Results: None of the retardant treatments used had any effect on the height, flowering, fruiting or appearance of Christmas cherries or Christmas peppers.

Publications: None.

An Evaluation of Rieger Elatior Begonias

Kenneth C. Sanderson and Willis C. Martin, Jr.

Nature of Work: Rieger elatior begonias were hybridized and developed by the firm of Otto Rieger, Nurtingen, Germany. Plants used in this experiment to determine if they could be produced in Alabama were furnished by Mikkelsens, Inc. Two hundred 5.6 cm pots of 7 cultivars of Rieger begonias were potted into 15 cm pots on August 7, 1971. Cultivars used included: Aphrodite Cherry Red, Aphrodite Red, Aphrodite Rose, Aphrodite Pink, Schwabenland Orange, Schwabenland Pink, and Schwabenland Red. Potting media consisted of 1:1:1:3 soil, sphagnum peat moss, perlite and Jiffy-Mix (a commercial peat-lite mix consisting of peat moss and vermiculite). The pH of the media was near 5.5, so no adjustment was made. Osmocote 14-14-14 was added to the media prior to potting at the rate of 1.6 kg per m_3. Fertilization also consisted of 20-20-20 liquid applied every 2 weeks at the rate 227 g per 379 ℓ. The plants were grown in a lightly shaded, air-cooled greenhouse. Later in the crop the cooling system was found to contribute to the disease problem so cooling was restricted to the daylight hours; however, the fans were permitted to operate continuously. A Chapin water system was employed in watering to minimize disease. The plants were drenched with 227 g per 379 ℓ each of Dexon and Benlate at potting and on October 7. A Benlate spray was applied on October 14. Biotrol was used as a spray for worms on September 2. Plants were covered with black cloth daily, 4:30 p.m. to 7:30 a.m., starting on September 20 and ending on October 20. The black cloth was used to shorten plant growth and to develop uniform flowering.

Results: Plants were in flower and in a salable condition on October 25. Approximately 10 weeks growing time was required to produce this crop. This amount of growing time is less than that required for most chrysanthemums or other major flowering pot plants grown in Alabama. The high initial cost of Reiger elatior begonias (49 to 56 cents each) is probably more than compensated for by this short term in the greenhouse and high wholesale price (other begonias selling for $2.00 - $2.50 do not compare in quality).

Foliage diseases, especially mildew and botrytis, were production problems. Early in the growth of the plants, mildew appeared to be spotting the leaves; however, black sunken areas were noted later on some leaves and identified as being caused by botrytis.

The two flowering groups grown in this experiment were Aphrodite and Schwabenland. The Aphrodite plants had heart-shaped dark green foliage, full double azalea-like blooms, and generally were taller than the Schwabenland plants. Aphrodite Red and Rose were quite similar in color; however, petals of flowers on the Red showed some fading with age. Aphrodite Cherry Red was a more brilliant red than the other Aphrodites. Aphrodite Pink produced lighter green foliage, which appeared less susceptible to disease than the other Aphrodites. Growth of Aphrodite Pink is not as strong or upright as the other Aphrodites (the Pink is probably recommended for hanging baskets for this reason). Schwabenland plants were heavier stemmed, stronger and more erect growing than the Aphrodites. Flowers were semi-double with a yellow eye. Foliage was similar to the Aphrodites.

Publications: None.

Boron Toxicity of Two Chrysanthemum Cultivars

G. Jay Gogue and Kenneth C. Sanderson

Nature of Work: The purpose of this research was: (1) to determine the foliar boron content of two chrysanthemum cultivars when B was added to the media in various amounts, (2) to establish toxic foliar levels and (3) to study the effects of B addition on growth. Concentrations of B ranging from 13 ppm to 800 ppm were applied (100 ml per 15 cm pot) to the media of the chrysanthemum cultivars Improved Albatross and CF No. 2 Good News.

Results: Element content and growth was influenced by B addition. Increases in B concentration applied generally increased foliar B (Fig. 1). Seasonal variation was observed in injury time with toxicity symptoms appearing sooner in an April to May experiment than in a December to March experiment and in foliar toxic levels. Boron toxicity symptoms were observed at foliar levels of 236 ppm in Improved Albatross and 350 ppm in CF No. 2 Good News 4 days after B application in an April to May experiment, while 7 to 28 days were required to produce symptoms at foliar levels of 159 ppm in Improved Albatross and 144 ppm in CF No. 2 Good News in a December to March experiment. Foliar N, P, K, and Zn content increased with increases in B concentration applied. Length and weight of flowering stems and diameter and dry weight of flowers decreased with increases in B concentration applied (Table 9). Foliar B levels exceeding 100 ppm reduced growth.

Publications:

Gogue, G. J. 1970. Boron, sodium and zinc tolerance of chrysanthemums grown in processed garbage amended media. Masters thesis, Auburn Univ., Auburn, Ala. 116 p.

Gogue, G. J. and K. C. Sanderson. 1973. Boron tolerance of Chrysanthemum morifolium Ramat. (HortScience 8: [illegible]).

1/ Former graduate student and Associate Professor respectively. Agr. Exp. Sta. Auburn Univ. Auburn, Alabama. Dr. Gogue's present address: Ecological Services, Miss. Test Station, Dept. of Interior Bay, St. Louis, MS.

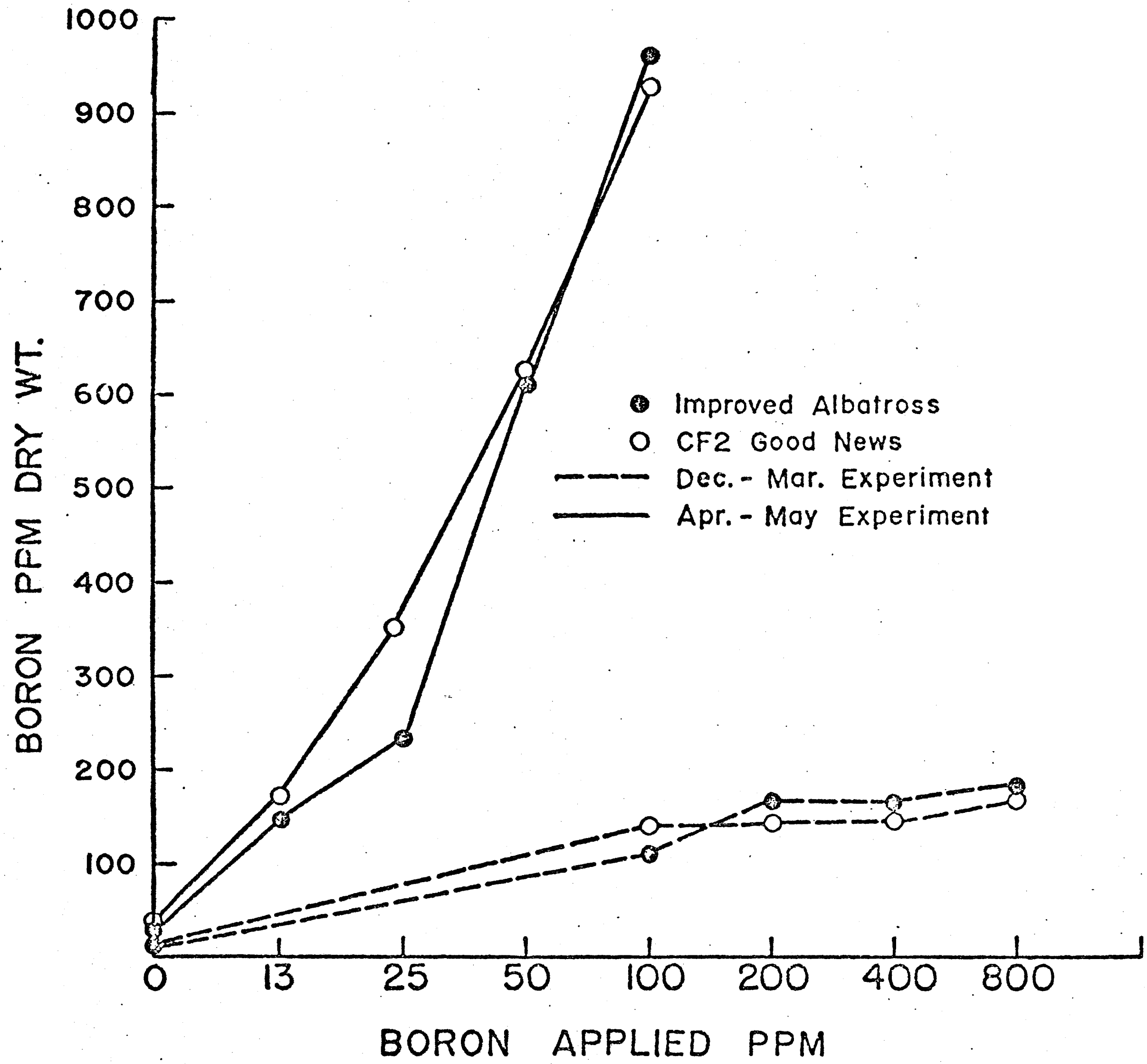

Fig. 1. Foliar B conc. of two chrysanthemum cultivars treated with a single B application.

Table 9. Mean flowering stem length and flower diameter of chrysanthemums treated with boron

Growth Data	B Treatments (ppm)				
	0	100	200	400	800
Stem length (cm) . . .	52.5a[z]	46.9ab	41.4ab	35.1ab	26.0b
Flower diam. (cm) . .	11.8a	-1.2a	10.1abc	9.0bcd	7.3d

[z] Mean separation, in rows, by Duncan's multiple range test, 5% level.

Growth and Foliar Analysis of Two Chrysanthemum Cultivars Grown in Two Soil Media

G. Jay Gogue and K. C. Sanderson1/

Nature of Work: Chrysanthemums, cv. 'Improved Albatross' and cv. 'CF No. 2 Good News' were grown in two media: 1:1 soil and peat and 1:1:1 soil, perlite and peat. Both media were adjusted to a pH of 6.0 with either $CaCO_3$ or So Gypsum and Superphosphate were added to the adjusted media at the rate of 28.4g/23 ℓ and 56.7 g per 23 ℓ, respectively. Beginning 1 week after planting and continuing until flowering, a constant fertilization program of 200 ppm N, P, and K (from reagent grade chemicals) was applied at each watering. The growth and foliar N, P, K, Ca, Mg, Mn, Cu, Al, B, Na, and Zn were examined with leaf samples being taken 1 week after the end of vegetative lighting period at approximately the fifth or sixth node.

Results: No differences were observed in the fresh weight and length to the two media (Tables 10 and 11). Foliar N, P, Mg, Fe, Cu, and Na content of the two cultivars was similar in both media. Both cultivars absorbed more Ca when grown in soil, perlite and peat (Table 12). 'Improved Albatross' accumulated more K, Mn, Al, B, and Zn when grown in soil, perlite and peat than when grown in soil and peat. The foliar values for the 12 elements are not in complete agreement with those reported by other researchers but are believed to be a useful measure of "optimum" mineral content.

Publications:

G. J. Gogue. 1970. Boron, sodium and zinc tolerance of chrysanthemums grown in processed garbage amended media. Masters' Thesis, Auburn University, Auburn, Ala. 116 p.

Gogue, G. J. and K. C. Sanderson. 1973. Foliar analysis of two chrysanthemum cultivars grown in two soil media. Florist Review 153: 63-65.

1/ Former graduate student and Associate Professor, respectively, Agr. Exp. Sta. Auburn Univ. Auburn, Ala. Dr. Gogue's present address: Ecological Services, Miss. Test Sta., Dept. of Interior, Bay St. Louis, MS.

Table 10. Growth and foliar nutrient concentration of chrysanthemum grown in 2 media

Measurement	Media	
Growth data	Soil and peat	Soil, peat and perlite
Flowering stem fresh wt. (g)	66a[z/]	42b
Flower dry wt. (g)	17a	14b
Stem length (cm)	84a	62b
Flower diameter (cm)	13a	12b
Foliar concentration		
N%	5.5a	4.8b
P%	0.7a	0.5b
K%	5.4b	7.2b
Ca%	1.0b	1.3a
Mg%	0.4a	0.2b
Mn ppm	296a	318a
Fe ppm	101a	98a
Cu ppm	39b	54a
Al ppm	168b	240a
B ppm	103b	191a
Na ppm	301b	522a
Zn ppm	67b	129a

[z/] Mean separation, in rows, by Duncan's multiple range test, 5% level.

Table 11. Effect of media on flowering stem fresh weight, flower dry weight, stem length, and flower diameter of 2 chrysanthemum cultivars

Media[z/]	Growth data			
	Flowering stem fresh wt. (g)	Flower dry wt. (g)	Stem length (cm)	Flower diam. (cm)
Improved Albatross				
SP	82.89a[y/]	2.98a	76.38a	11.50a
SPtP	80.30a	3.17a	59.68b	11.38a
CF No. 2 Good News				
SP	105.27a	3.82a	93.48a	15.15a
SPtP	110.09a	3.76a	93.73a	15.53a

z/ Media were: SP) 1:1 Soil:Peat and SPtP) 1:1:1 Soil:Perlite:Peat.

y/ Means separations, separations for cultivar in columns, by Duncan's multiple range at the 5% level.

Table 12. Foliar N, P, K, Ca, Mg, Mn, Fe, Cu, Al, B, Na, and Zn concentration of 2 chrysanthemum cultivars grown in amended media

Elements	Media[z/]	Cultivars	
		Improved Albatross	CF No. 2 Good News
N (%)	SP	5.52a[y/]	5.37a
	SPtP	5.28a	5.28a
P (%)	SP	.68a	.75a
	SPtP	.69a	.77a
K (%)	SP	5.28b	6.15a
	SPtP	6.24a	6.27a
Ca (%)	SP	.78b	1.21b
	SPtP	.99a	1.38a
Mg (%)	SP	.32a	.51a
	SPtP	.32a	.51a
Mn (ppm)	SP	252.0b	340.5a
	SPtP	282.0a	361.5a
Fe (ppm)	SP	102.0a	100.0a
	SPtP	106.0a	103.2a
Cu (ppm)	SP	41.5a	37.0a
	SPtP	37.2a	32.7a
Al (ppm)	SP	155.5b	181.0a
	SPtP	217.5a	200.0a

Table 12. (cont'd)

Elements	Media[z]	Cultivars	
		Improved Albatross	CF No. 2 Good News
B (ppm)	SP	100.5b	104.7a
	SPtP	130.2a	103.7a
Na (ppm)	SP	346.0a	306.0a
	SPtP	415.0a	294.0a
Zn (ppm)	SP	75.7b	57.5a
	SPtP	65.7a	57.2a

z/ Media were: SP) 1:1 Soil:Peat and SPtP) 1:1:1 Soil:Perlite:Peat.

y/ Means separation, in columns, by Duncan's multiple range test at the 5% level.

Fertilization of Potted Chrysanthemums with Several Dry-Form Fertilizers-plus Liquid Fertilization

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Nature of Work: Previous years' research indicated that two urea-form fertilizers plus liquid fertilization yielded plants with the most flowers. Three experiments were conducted in 1971 to test four urea-form fertilizers and three non-urea-form fertilizers. All fertilizers were used in conjunction with applications of 25-10-10 at the 2-1/2 lb. per 100 gal. every 2 weeks. Fertilizer treatments incorporated prior to planting were: (1) check, none; (2) 12 g Agriform tablet (14-4-6) per pot; (3) Nitroform Urea (38-0-0) 88 g per 23 ℓ; (4) Sta-Green (12-6-6) 264 g per 23 ℓ; (5) Sulfur-coated urea (38.6-0-0) 88 g per 23 ℓ; (6) Osmocote (14-14-14) 264 g per 23 ℓ; (7) 8-8-8, 339 g per 23 ℓ; (8) Mag-Amp (7-40-6) 339 g per 23 ℓ. Media consisted of 1:1:1 soil, peat and perlite amended with 200 g of limestone and 60 g of superphosphate per 23 ℓ. Five cuttings of the cultivar 'Yellow Mandalay' were potted in a 15 cm pot. Experiments 1, 2, and 3 were conducted during February 17 to May 6; March 2 to May 25; and March 16 to June 9, respectively.

Results: Osmocote, a non-urea fertilizer produced the tallest plants; however, sulfur-coated urea plants were only a centimeter less in height (Table 13). The check yielded the shortest plants and the fewest flowers per plant. Osmocote, the best treatment, produced 1.7 more flowers per plant than the check treatment. These experiments differ from previous work. Differences might be due to unequal amounts of nitrogen applied and a different rate of breakdown of urea in previous experiments.

Publications: None.

Table 13. Height and number of flowers per plant of Yellow Mandalay Chrysanthemums Fertilized with Various Dry-Form Fertilizers Plus Liquid Fertilization (2½ lb. 25-10-10 every 2 weeks)

Treatment	Height (cm)	Number of flowers per plant
Check	26.5	3.7
12g Agriform tablet 14-4-6 . .	28.7	4.7
Nitroform Urea 38-0-0	27.8	4.3
Sta-Green 12-6-6	27.8	4.5
Sulfur-coated Urea 38-0-0 . . .	30.2	4.4
Osmocote 14-14-14	31.1	5.4
8-8-8	28.2	4.9
Mag-Amp 7-40-6	29.7	5.1