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COST OF PRODUCING CONTAINERIZED GARDEN MUMS: 1996

Brian E. Whipker, Extension Floriculturist

(This article is from a presentation made by Dr. Whipker at the 1996 Southeast Greenhouse Conference and Trade Show)

Garden mums continue to be a popular fall crop. Profitable production of garden mums is dependent upon the knowledge and control of production costs. By having the knowledge of a crop's production costs, a grower will be better prepared to make production decisions on the optimal number of plants to produce and to help establish prices. The costs presented here should be useful to current growers who wish to compare their own production expenses and for potential growers in determining whether to begin growing garden mums. The data was collected from two Midwestern growers who produce between 30,000 and 70,000 1 gallon containerized garden mums. Costs are calculated for the 1996 growing year.

Variable Costs Versus Fixed Costs

Costs can be categorized as either variable or fixed. Variable costs, also called direct costs, are costs that are incurred directly by the crop and occur only if you grow the crop. Variable cost

items are the basic inputs required to grow a crop -- pots, plants, substrate, or chemicals, for instance. These items' costs are fairly easy to allocate to a specific crop because you know the materials used to produce the crop and production practices you followed. The direct costs are presented in Table 1. Total direct costs for the two firms vary from \$0.82 per pot to \$0.98 per pot. The largest differences between the two firms occur with insecticide, fungicide, and labor costs. The pie chart for Firm B's direct costs are presented in Figure 1 and it shows that labor accounts for 30.9% of the direct costs followed by the flat/substrate/pot costs (24.8%) and the cost of cuttings (20.6%).

Fixed costs, also called overhead or indirect costs, are incurred whether or not a crop is produced. They include items like management salaries, depreciation, insurance and taxes. Fixed costs represent general operation expenses present in every greenhouse facility. To get a good measure of profitability, these costs need to be

Table 1. Direct costs for field production of containerized garden chrysanthemums.

ITEM	TYPE	COST PER POT	
		Firm A	Firm B
Direct Items			
Cutting		\$0.1928	\$0.2000
Flat/Insert/Substrate		\$0.0190	\$0.0230
Substrate for pots		\$0.0780	\$0.0780
Pot	1 gallon	\$0.1200	\$0.1400
Fertilizer	(20-10-20)	\$0.0375	\$0.0200
Acid	(Sulfuric)	\$0.0033	\$0.0000
Insecticide	(Talstar/Dipel/Avid/Lannate)	\$0.0829	\$0.0273
Fungicide	(Ornalin/Domain/Subdue/Banrot)	\$0.0060	\$0.1222
Growth Regulator	(B-Nine)	\$0.0070	\$0.0120
Growth Regulator	(Florel)	\$0.0022	\$0.0000
Soil Sterilizer	(Brom-o-gas)	\$0.0000	\$0.0060
Land		\$0.0334	\$0.0071
Sub-Total		\$0.5371	\$0.6355
Labor		\$0.2480	\$0.3007
Sub-Total Direct Costs		\$0.7851	\$0.9362
Interest on Direct Expenses			
	(Direct Expenses × 9% interest × 0.5 years)	\$0.0353	\$0.0421
TOTAL DIRECT COSTS		\$0.8204	\$0.9783

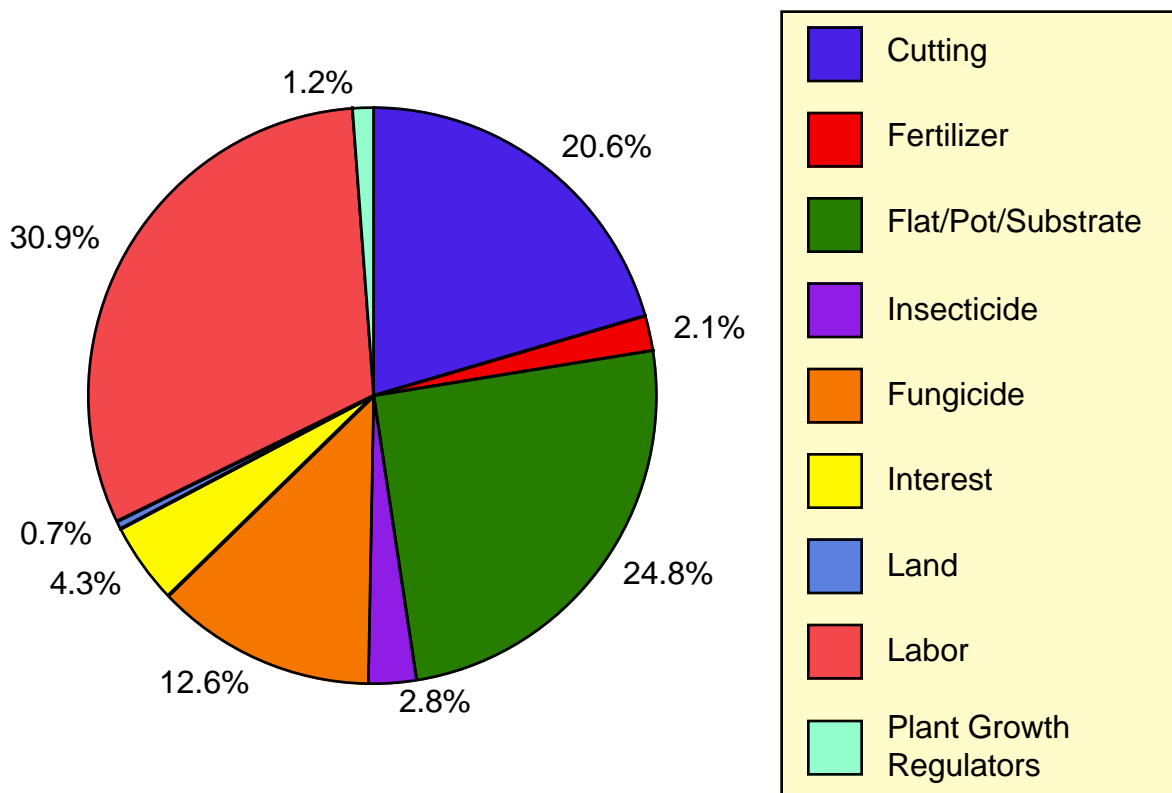


Figure 1. Direct costs per pot for Firm B. The percent of total for each cost category is indicated on the pie chart.

allocated to each crop grown. In general, for greenhouse operations, fixed costs are allocated to a crop on a cost-per-square-foot-per-week basis. Because garden mums are grown outdoors at both of the example firms used in this article, fixed costs were allocated to the mum crop on a percentage basis, based on: 1) the actual use of a piece of equipment or 2) as a percentage of sales. The remaining percentage not allocated to the mum crop would then be allocated to the other crops produced like bedding plants or poinsettias.

Fixed costs (indirect costs) are presented in Table 2. Depreciation for equipment expenses were similar for the two firms, varying by only \$0.05 per pot. The depreciation expense is fairly

low and can be attributed to each firm's reliance on used equipment. Firms which purchase new machinery and equipment will have a higher depreciation expense. Larger differences occurred with the overhead operation costs, with a \$0.19 per pot difference between the two firms. This difference was primarily due to a higher full time management labor (salaried labor) costs and debt costs for firm B.

Shrink

Even under the best production practices, a certain percentage of the crop will not be marketable due to poor growth, disease, or damage. The cost of inputs for these

Table 2. Indirect costs for field production of containerized garden chrysanthemums.

ITEM	COST PER POT	
	Firm A	Firm B
Equipment Costs		
Mum Equipment (Depreciation)		
Weed matt, water system, injectors	\$0.1063	\$0.1429
General Equipment (Depreciation)		
Sprayer, trucks, tractors, wagons, soil mixer, potting machine (Percentage Allocated to Mums)	\$0.0561	\$0.0609
Interest on Capital Equipment		
(Total annual equipment costs × 9%)	\$0.0146	\$0.0183
Repairs on Capital Equipment		
(Total annual equipment costs × 3%)	\$0.0049	\$0.0061
Sub-Total	\$0.1818	\$0.2282
Overhead Operation Costs		
Salaried Labor	\$0.1056	\$0.2263
Taxes	\$0.0015	\$0.0021
Insurance	\$0.0025	\$0.0193
Utilities : Telephone	\$0.0050	\$0.0107
Utilities : Electricity	\$0.0050	\$0.0214
Misc. Costs	\$0.1667	\$0.0714
Mortgage	\$0.0000	\$0.0861
Medical Insurance	\$0.0000	\$0.0178
Social Security - Employer	\$0.0158	\$0.0339
Social Security - Employee	\$0.0190	\$0.0240
Sub-Total	\$0.3211	\$0.5131
TOTAL INDIRECT COSTS	\$0.5029	\$0.7413

nonmarketable plants have to be accounted for by the operation. This is done by adjusting the production cost by a shrink factor. In this case, a 3% shrink was calculated which involved dividing the total costs by 0.97 and using the quotient as the final cost including shrink. Production costs will increase for growers who have a higher percent of shrink.

Total production costs per pot, including a 3% shrink and costs for marketing the crop was \$1.58 for Firm A and \$2.07 for Firm B (Table 3). The percentage distribution of all costs including delivery (marketing) costs for Firm B show that direct costs account for the majority (30.7%) of all production costs and overhead costs (24.8%) is the next largest category (Figure 2).

Profitability

Adding the total variable costs and total fixed costs together provides the total costs of producing a crop (Table 3). The profitability of the crop is directly related to the price received. The profitability per pot of a delivered garden mum was \$1.016 for Firm A (a 39% profit margin) and \$0.627 for Firm B (a 23% profit margin).

Florel and 2nd Pinch Comparative Analysis

When analyzing production costs it is sometimes desirable to make direct comparisons between production techniques to help with future production decisions. A good example of comparative analysis is comparing a production system that relies on a second pinch for branching

Table 3. Total cost and revenue analysis for containerized garden chrysanthemums.

ITEM	COST PER POT	
	Firm A	Firm B
Total Direct Costs	\$0.8204	\$0.9783
Total Indirect Costs	\$0.5029	\$0.7413
TOTAL PRODUCTION COSTS	\$1.3233	\$1.7196
3% Loss (shrink = [Total Costs ÷ 0.97] – Total Costs)	\$0.0409	\$0.0532
TOTAL COSTS (including shrink)	\$1.3642	\$1.7728
Marketing Expenses (Delivered Plants)		
Delivery Cost (Labor and Expenses)	\$0.22	\$0.30
TOTAL COSTS (DELIVERED)	\$1.5842	\$2.0728
REVENUE		
Wholesale Price (Same for Non-Delivered & Delivered)	\$2.60	\$2.70
TOTAL NET PROFIT PER POT (WHOLESALE)		
NON-DELIVERED	\$1.236	\$0.927
DELIVERED	\$1.016	\$0.627
NET PROFIT MARGIN ANALYSIS		
NON-DELIVERED	47%	34%
DELIVERED	39%	23%

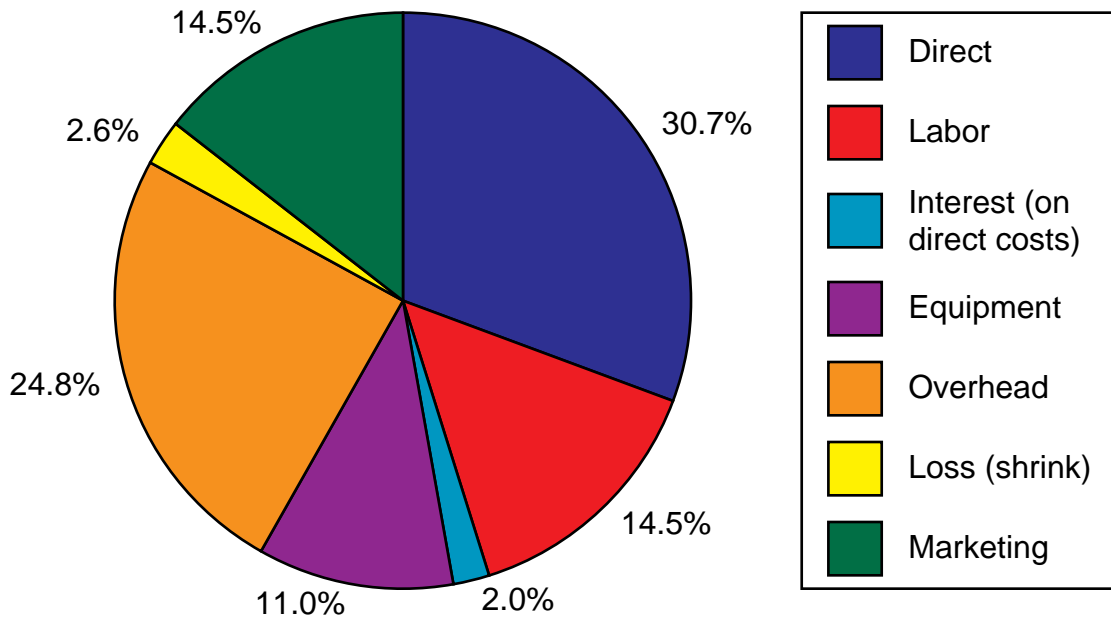


Figure 2. Total costs per pot for Firm B. The percent of total for each cost category is indicated on the pie chart.

to the use of Florel (Table 4). The question is, which system (assuming both result in similar product) is most cost effective? Notice that the use of Florel reduces the need for B-Nine as a height control treatment. In this example, using Florel is more cost effective (a savings of 2.94¢ per pot) than a second pinch. Growers should always examine alternative production techniques to help keep costs as low as possible. You may be able to increase profitability by simple

comparative analysis. Another comparative analysis that could be conducted is evaluating alternative fertilization programs for chrysanthemum production. Is there an equally effective yet less expensive method out there?

Trends

A similar cost study was conducted in 1990 with Midwestern garden mum producers and a comparison of costs between 1990 and 1996 is

presented in Table 5. Overall, total direct costs per pot are lower in 1996, primarily due to lower costs for the cutting and pot. Even though the total costs are higher in 1996 than in 1990, the sales price has also increased. For Firm A this means higher profitability in 1996 than in 1990; Firm B dropped slightly.

The examples given in this article

Table 4. Comparative analysis of applying Florel or utilizing a second pinch in chrysanthemum production.

ITEM	COST PER POT	
	Florel	2nd Pinch
Pinch #2 (Labor)	\$0.0000	\$0.0306
B-Nine (Chemical Costs)	\$0.0070	\$0.0120
B-Nine (Labor & Equipment Costs)	\$0.0040	\$0.0040
Florel (Chemical Costs)	\$0.0022	\$0.0000
Florel (Labor & Equipment Costs)	\$0.0040	\$0.0000
Total Cost Per Pot	\$0.0172	\$0.0466
Cost Differences:		
Per Pot		\$0.0294
For 30,000 Pots		\$882
For 50,000 Pots		\$1,470
For 70,000 Pots		\$2,058

Table 5. Cost per pot from a study conducted in 1990, and 1996 costs for Firm A and Firm B.

ITEM	COST PER POT		
	1990	1996	
		Firm A	Firm B
Cutting	\$0.250	\$0.193	\$0.200
Pot (1 gallon)	\$0.250	\$0.120	\$0.140
Total Direct Costs	\$0.722	\$0.537	\$0.636
Labor	\$0.242	\$0.248	\$0.301
Total Costs	\$1.256	\$1.323	\$1.720
Sales Price	\$2.25	\$2.60	\$2.70
Profit Per Pot			
(Non-delivered)	\$0.994	\$1.236	\$0.927
Profit Margin			
(Non-delivered)	44.2%	47.0%	34.0%

should enable mum growers to examine the profitability of their crops for their own operation. Of course costs will vary among greenhouses according to their amount of capitalization in equipment and structures and their ability to purchase inputs at lower costs. Therefore, each operation will need to calculate their specific production costs in order to determine their own profitability. Many times growers are excellent at just that - growing. However, the bottom line in business is not production rather profitability.

DOES PERLITE PLAY A ROLE IN FLUORIDE TOXICITY OF FLORICULTURAL CROPS?

Tammy L. Everett and Paul V. Nelson
Department of Horticultural Science, NCSU

Fluoride may be great for our teeth, but it can present problems for some of the crops we grow as floriculturists. Many of the sensitive plants belong to two families, Liliaceae and Marantaceae, but other species are affected (Table 1). Although most of the species sensitive to fluoride are grown as foliage plants, many of them such as spider plants and Tahitian bridal veil are common to most greenhouses.

The common symptoms of fluoride toxicity in plants include chlorosis of the tips and margins of older leaves followed by necrosis of these same areas. How much fluoride is enough to cause problems? As little as 1 ppm F in the water

used for plant irrigation can result in toxicity symptoms on sensitive plants. Many municipal water sources will inject F as an additive to prevent tooth decay at 1 ppm, and F is also contained in many fertilizer sources and substrate components used in greenhouse and nursery production (Table 2).

We have known about the dangers of fluoride toxicity for years, and many growers follow recommended procedures to avoid / prevent fluoride toxicity in sensitive crops. For example, most Easter lily growers will try to maintain a substrate pH of 6.5 to 6.8 as it has been reported that fluoride becomes tied up in the substrate as calcium fluoride at this pH. Some growers will

Table 1. Commonly produced plants that exhibit sensitivity to fluoride.

Species	Common name	Family
<i>Calathea spp.</i>	Many species	Marantaceae
<i>Chamaedorea elegans</i>	Parlor Palm	Palmae
<i>Chlorophytum comosum</i>	Spider Plant	Liliaceae
<i>Cordyline terminalis</i>	Good Luck Plant	Agavaceae
<i>Ctenanthe oppenheimiana</i>	Never-Never Plant	Marantaceae
<i>Dracaena spp.</i>	Many species	Agavaceae
<i>Gibasis pellucida</i>	Tahitian Bridal Veil	Commelinaceae
<i>Lilium spp.</i>	Many species	Liliaceae
<i>Maranta leuconeura</i>	Prayer Plant	Marantaceae
<i>Spathiphyllum spp.</i>	Many species	Araceae
<i>Yucca spp.</i>	Many species	Agavaceae

concentration on fluoride availability.

**Experimental Procedures
Fluoride Leaching Study.**

We contacted the Perlite Institute to develop a list of primary sources of perlite used in the North American agricultural market. Expanded, horticultural grade samples were obtained from three major sources, (one in Greece and the

avoid using products such as superphosphate (0-20-0; not readily available anymore) and perlite in production of plants known to be sensitive to F toxicity.

Although perlite does contain a significant level of fluoride, there is still some question as to whether the use of perlite in a substrate leads to fluoride toxicity. Earlier research has shown that F in perlite can be quickly reduced to very low levels simply by two or three heavy leachings. In many crop production systems, enough leaching occurs during the first few weeks to dramatically reduce F released from perlite into the substrate solution. Granted, subirrigation and other low-leach production systems do not allow for the rapid removal of F from the substrate, but perlite was targeted as a fluoride source long before such systems were widely used in our industry. Perhaps perlite has been given an undeserved label as a fluoride toxicity contributor. This would be unfortunate, because many highly effective and economical substrates contain perlite. The validity of the perlite-fluoride toxicity connection needed to be evaluated, and as such, set the stage for our study. Our objectives were ① to measure the initial release level and subsequent leaching pattern of fluoride from five major sources of perlite used in the North American ornamental industry; ② to assess the potential for fluoride toxicity from perlite on three sensitive crops; and ③ to measure the influence of substrate solution pH and calcium

other two in New Mexico) along with one secondary source from California and one major brand of unknown origin.

The soluble fluoride content of each sample was evaluated using a leaching test. Perlite samples (100 cm³ sample size) were leached with 100 ml of pH 5.2 sodium phosphate buffer over a 3 minute period. This procedure was repeated for a total of 5 leachings on each sample.

Perlite has a water holding capacity of 38% of its bulk volume when at container capacity. Since equal volumes of water and perlite were used in each leaching step, the leaching percentage was 62%. That is, 62% of the buffer applied passed through the perlite during the first leaching. This

Table 2. Levels of soluble fluoride measured in several substrate and fertilizer components expressed as parts per million (ppm) on a weight basis (mg/kg).

Amendment	ppm F
Single superphosphate	2,600
Diammonium phosphate	2,000
Triple superphosphate	1,600
Resin coated slow release fertilizer	376
Cotton hull ash	67
Dolomitic limestone	32
Ferrous sulfate	21
Cow manure	17
Perlite	17
Urea formaldehyde	14
Ammonium nitrate	7
German peat	4

is higher than the leaching percentage during a typical watering in the greenhouse but not unrealistic for a heavy watering.

Fluoride was analyzed in the leachates by an HPLC procedure. A Dionex model DX-300 chromatography system was used. Anions were separated in an ionPac AS4A column. A sodium tetraborate eluent was used.

Plant Tests. Three crops were grown in a greenhouse to assess the potential toxicity of fluoride in perlite. These included the Asiatic lilies 'Pixie Orange' and 'Sunray'; Tahitian bridal veil (*Gibasis pellucida*); and spider plant (*Chlorophytum comosum* 'Variegatum').

The pots used for these crops and the number of propagated units per pot were as follows. For lilies, one 12/14 cm circumference bulb was planted in each 13 cm standard plastic pot. Twenty five unrooted bridal veil cuttings were stuck in each 13 cm plastic azalea pot. And finally, 3 spider plant pups were planted in each 13 cm plastic azalea pot.

Temperature settings in the greenhouse were 62 °F (17 °C) at night and 75 °F (24 °C) during the day.

Fertilization for all crops consisted of a weekly application of complete fertilizer at 480 ppm nitrogen. An acid reaction fertilizer was alternated with an alkaline fertilizer to control substrate pH level.

Steam distilled water was used for watering and fertilization to avoid fluoride contained in our greenhouse tap water.

A randomized complete block experimental design with 12 treatments, 4 replications, and 4 pots per plot was used. In the case of lilies there were 2 pots of each cultivar within each plot.

The 12 treatments fell into 4 sets. In the first set, no perlite was used. Concrete grade sand

was used in its place. In the second and third sets perlite was incorporated into the substrate at 25 and 50 percent by volume. The remaining substrate component was sphagnum peat moss. Within each of these 3 sets of treatments there were 3 substrate pH levels; 5.3, 5.9, and 6.5. The low pH was selected because it is the lowest safe level for culture of these crops and because fluoride availability increases with declining pH. The high pH was selected because it was reported in the literature to completely block fluoride toxicity. In the fourth set of treatments gypsum was incorporated into low pH substrate to determine if this pH-neutral calcium source could be used to avert fluoride toxicity without raising the pH. Only liming materials were incorporated into the substrate. Superphosphate was avoided due to its fluoride content.

Results and Discussion

Fluoride Leaching Study. Sample A contained the lowest amount of soluble fluoride (Figure 1). Fluoride declined from a high of 0.05 ppm in the first leachate to 0.01 in the fifth leachate. A second range of fluoride levels were found in perlite sources C, D, and E. Fluoride levels in these sources declined from 0.13 ppm in the first leachate to 0.07 in the fifth leachate. Perlite source B contained the highest levels of

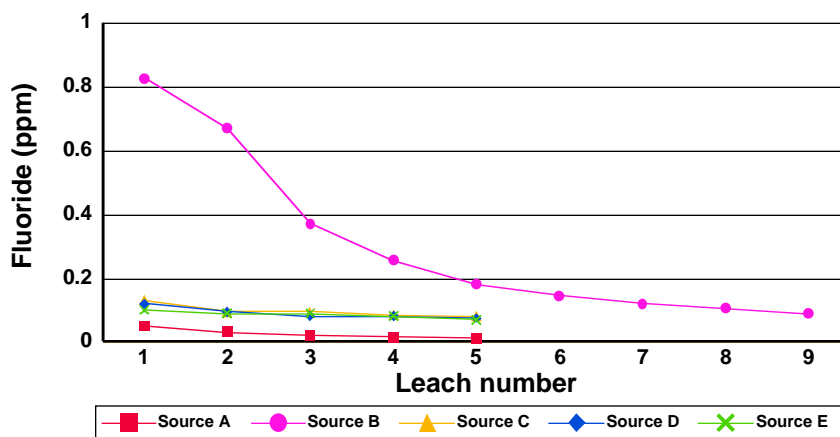


Figure 1. Concentrations of soluble fluoride in each leaching of five sources of perlite. Perlite Source B was used for growing spider plants and Tahitian bridal veil; Source E was used for the two lily cultivars.

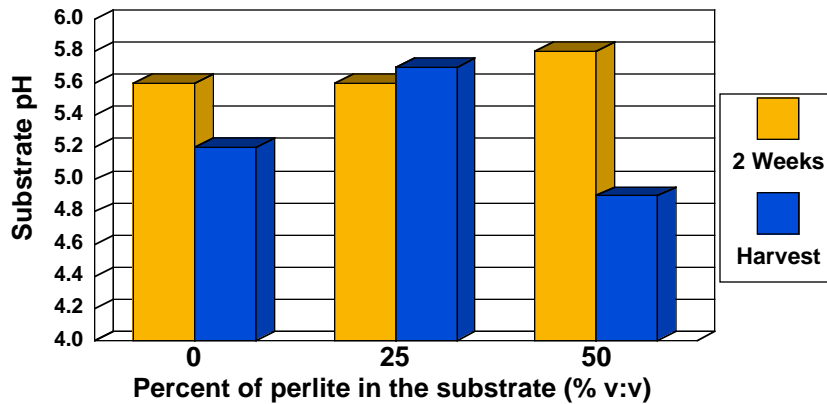


Figure 2. Substrate pH measured for the low pH treatment (targeted pH of 5.3) after 2 weeks and at harvest (6 weeks) for the Asiatic lilies.

soluble fluoride. This source was leached 9 times. Leachate fluoride concentrations were, in the first, fifth and ninth leachings, 0.83, 0.18, and 0.09 ppm.

The initial concentration of fluoride in source B would most likely be toxic to sensitive plants. However, the concentration quickly declines to what would appear to be a safe level. It would seem doubtful that the concentrations in the other sources would be toxic for pot culture of crops.

We used Source B perlite for the Tahitian bridal veil and the spider plant studies. Source E perlite was used for growing the lilies. Although we planned to use source B for all three studies, the large quantity needed for culture did not arrive on time.

Plant Tests. No fluoride toxicity symptoms developed in any of the test crops.

Lily. Substrate pH levels were sufficiently low in many of the lily treatments to maintain fluoride in an available state (Figure 2). The targeted pH treatments of 5.3, 5.9, and 6.5 were not precisely met, but the actual pHs very well covered the range from high availability to effective tie up of fluoride.

There was no way to tell whether the addition of calcium sulfate at low pH can prevent fluoride toxicity, since fluoride toxicity did not occur with any treatment on any species in our experiment. However, these last three treatments (target pH of 5.3 using 0, 25, and 50% perlite in the substrate) did provide extremely low substrate pH, as low as 4.6 (data not shown). Even at this low pH fluoride toxicity did not occur.

Pictures of the lilies were taken two weeks after initial bloom. Even by this late stage no fluoride scorch had developed. Sometimes there were symptoms of senescence on the lower one to three leaves. These symptoms were present across all treatments and took on the form of uniform chlorosis of the entire leaf blade followed gradually by necrosis. These were definitely not fluoride toxicity symptoms

Tahitian Bridal Veil. The measured pH data for bridal veil is similar to that for lilies (Figure 3). Substrate pH ranged from a high value of 7.0 to a low value of 4.6. If the level of fluoride in perlite Source B had been toxic it would have manifested itself at these low pH levels. No toxicity occurred. It is entirely conceivable that

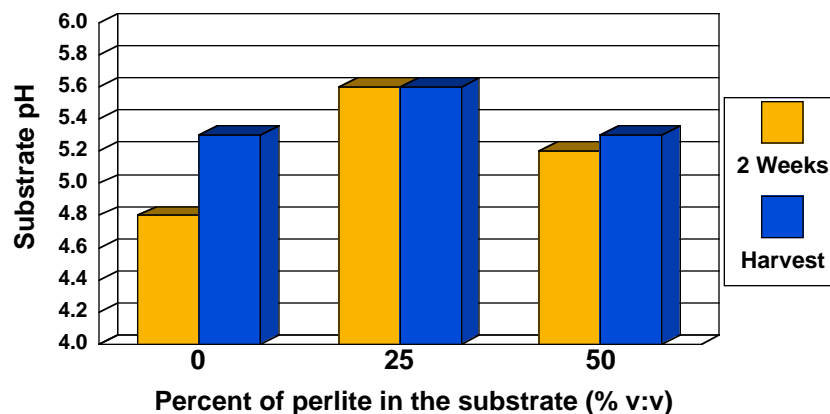


Figure 3. Substrate pH measured for the low pH treatment (targeted pH of 5.3) after 2 weeks and at harvest (8 weeks) for Tahitian bridal veil plants.

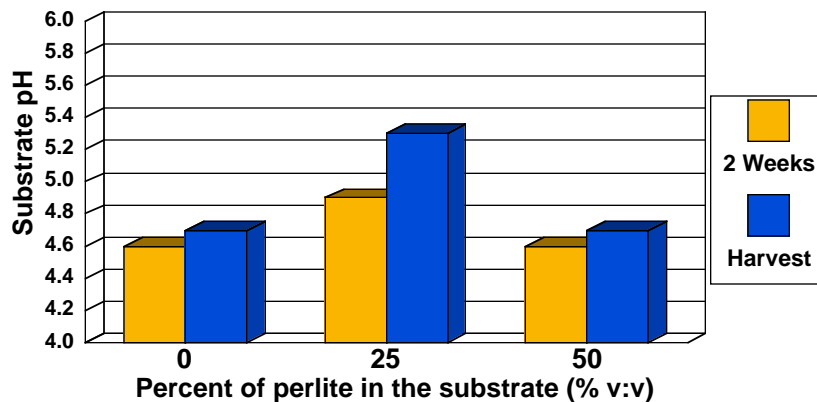


Figure 4. Substrate pH measured for the low pH treatment (targeted pH of 5.3) after 2 weeks and at harvest (7 weeks) for the spider plants.

the initial leach concentration of fluoride was potentially toxic but that it did not persist long enough in the substrate to cause a toxicity.

Spider Plant. Substrate pH for the spider plants also ranged from 4.6 to 7.0 (Figure 4). In general, there are more low pH values than in the previous two crops, yet, no fluoride toxicity occurred. The high fluoride Source B perlite was used in this crop.

Conclusions

We can draw the following conclusions from this study:

① Perlite sources vary in their soluble levels of fluoride. The initial concentration of fluoride

in leachate from the five sources of perlite used in this study ranged from 0.05 to 0.83 ppm. The higher value was potentially toxic but it did not persist. Soluble fluoride rapidly decreased in subsequent leachings to very low concentrations. If perlite was a cause of fluoride toxicity, the problem would be experienced in the initial weeks of culture. This has not been reported to be the case.

Toxicity is more prevalent in later stages of the crop. Follow-up studies (data not shown) with additional perlite sources found that perlite with an initial F concentration of 1.7 ppm could be used at 50% volume of substrate to produce 'Corsica' Asiatic lilies without fluoride toxicity; even when pH reached 4.2!

② Fluoride toxicity did not occur in three fluoride sensitive crops, Asiatic lily, Tahitian bridal veil, and spider plant, when grown in substrate containing up to 50% perlite at substrate pH levels below 5. Typically the substrate pH level would be 5.5 or higher and perlite would not exceed 25% by volume. Clearly, fluoride toxicity does not stem from these sources of perlite.

CALENDAR OF EVENTS

Event	Date	Time	Location and contacts
PPGA 29th International Bedding Plant Conference and Trade Show	Tuesday–Saturday 1–5 October		Hyatt Regency Hotel, Dearborn, Michigan. Contact PPGA at 800-647-7742 for further information.
NCCFGA Board Meeting	TBA mid-October		TBA. Contact Bonnie Holloman for further details.
NCSU Poinsettia Open House	Thursday 5 December	10:00 am to 3:00 pm	Horticulture Field Laboratory, Raleigh, N.C. Contact Roy Larson at 919-515-3133.

1996 WINTER TRIAL SUMMARY

Douglas A. Bailey, Department of Horticultural Science, NCSU

(The following summary was distilled from the 1996 NCSU Winter Annuals Evaluation. If you would like to receive a copy of the entire report that includes performance ratings for each cultivar, contact Doug Bailey at 919-515-1195 and request a copy of Horticulture Research Series No. 120)

During November 1995 through mid-May 1996, we evaluated 68 pansy selections plus 3 viola entries and recorded how well they performed in the North Carolina landscape. We also evaluated 23 dianthus and 5 snapdragon cultivars.

Weather during the winter and spring of 1996 was unkind to cool-season annuals (Table 1). Dianthus were smaller and less floriferous than in past years, and many snapdragons died before blooming. Even the pansies suffered, and flowering was less throughout the trial.

Leaders of the Pack

The following were selected in 1996 on their ability to display attractive landscape color throughout the majority of the winter and spring season. At any one time, other entries may have made a better short-term showing, but the "Leaders of the Pack" were selected for consistent, dependable full-season performance as a source of color and beauty in the landscape. Cultivars are listed in order of ranking, the first being ranked highest. The cultivar source is shown in parenthesis.

Pansies:

White--Clear: 'Rally Pure White' (PA), 'Universal Plus White' (GOLD)

White--Blotch: 'Rally White w/ Blotch' (PA), 'Accord White Blotch' (GOLD), 'Happy Face White' (BG), 'Bingo White w/ Blotch' (PA)

Yellow--Clear: 'Rally Yellow' (PA)

Yellow--Blotch: 'Universal Plus Yellow Blotch' (GOLD), 'Rally Yellow w/ Blotch' (PA)

Orange--Blotch: 'Scala Orange w/ Blotch' (ELI)

Rose--Blotch: 'Universal Plus Rose Blotch' (GOLD)

Red--Blotch: 'Accord Red Blotch' (GOLD)

Red / Yellow: 'Bingo Red & Yellow' (PA)

Blue--Clear: 'Rally True Blue' (PA), 'Accord Clear Blue' (GOLD), 'Vernale Atlantis' (ELI)

Blue--Blotch: 'Maxim Marina' (AAS)

Purple--Clear: 'Rally Lilac Cap' (PA)

Purple / White: 'Experimental Beaconsfield' (PA), 'Scala Beaconsfield' (ELI)

Mix: 'Universal Plus Blotch Mix' (GOLD), 'Accord Mix' (GOLD), 'Bingo Mix' (PA)

Table 1. Temperature and precipitation for November 1995 through May 1996 and 30 year temperature and precipitation averages for Raleigh, N.C.

Month	1995-96		1995-96	
	average daily temperature (°F) and percent change from 30 year avg	30 year average daily temperature (°F)	monthly precipitation (inches) and percent change from 30 year avg	30 year average monthly precipitation (inches)
November	46.6 (-10%)	51.7	5.19 (+53%)	3.40
December	39.2 (-9%)	42.9	1.87 (-44%)	3.34
January	37.8 (-6%)	40.2	4.72 (+25%)	3.79
February	42.4 (+1%)	42.1	2.25 (-40%)	3.75
March	45.7 (-9%)	50.1	3.84 (-8%)	4.19
April	58.7 (-3%)	60.4	4.07 (+21%)	3.36
May	67.8 (0%)	68.1	3.51 (-21%)	4.44

Violas: 'Mini Pansy Purple' (CSP), 'Velour Blue' (CSP)

Exceptional Performance Winners

Each year, the best of the best, those cultivars that exemplify outstanding performance during the trials, will be recognized as Exceptional Performance award winners. The winners are judged on full-season performance and are recommended as outstanding selections for our region. Growers, retailers and landscapers are encouraged to consider these cultivars first for their winter and spring color needs. Only two pansy cultivars were selected from 99 entries in the 1995–1996 winter trial:

1. 'Maxim Marina' (AAS)
2. 'Rally White w/ Blotch' (PA)

The season average ratings for the dianthus, pansy, and snapdragon series that had at least three entries are listed in Table 2 in descending order of average performance. The rating scale used in our trials ranges from 0 (all entries died) to 5 (excellent); plants were rated weekly. As mentioned earlier, the weather this year severely reduced plant

performance in our trials. The overall scores for this year are well below the averages attained over the past 4 years.

None of the dianthus cultivars rated at or

Table 2. Series average ratings for the 1995 / 1996 winter trials.

Series	Number trialed	Source	Avg. rating	No. wks with 50% plants in bloom
Dianthus				
Floral Lace	7	BALL	2.6	0
Ideal	7	ELI	2.6	0
Princess	7	GOLD	2.4	0.6
Pansy				
Scala	3	ELI	3.2	16
Vernale	3	ELI	3.2	13
Accord	10	GOLD	3.2	20
Rally	11	PA	3.1	17
Universal Plus	10	GOLD	3.1	19
Happy Face	6	BG	3.1	18
Bingo	10	PA	3.1	19
Atlas	6	BG	2.9	17
Snapdragon				
Chimes	4	GOLD	1.3	0

above the 3.2 level set as exceptional for full-season color. Flowering was very sporadic and plants were injured during winter cold snaps.

We are indebted to the following companies for supporting our 1995–96 winter trials:

- **AAS** All America Selections, 1311 Butterfield Road, Suite 310, Downers Grove, IL 60515
- **BALL** Ball Seed Co., P.O. Box 335, West Chicago, IL 60185
- **BEN** Ernst Benary Seed Growers Ltd., P.O. Box 1127, D-3510 Hann. Münden 1, Germany
- **BG** Bodger Seeds Ltd., 1800 North Tyler Avenue, Lompoc, CA 91733-3618
- **CSP** Clause Semences Professionnelles, 100 Breen Road, San Juan Bautista, CA 95045
- **ELI** Elidia Seed, Z.I. La Motte, BP 83, 26800 Portes lès Valence, France
- **GOLD** Goldsmith Seeds, Inc., P.O. Box 1349, Gilroy, CA 95020
- **PA** Pan American Seed, P.O. Box 438, West Chicago, IL 60185
- **SG** S&G Seeds, 5300 Katrine Avenue, Downers Grove, IL 60515

*Appreciation is also expressed to **Fafard, Inc.** and the **North Carolina Commercial Flower Growers' Association** for their donations to and support of the 1995–96 winter annual trial garden.*

Table 3. Number of weeks where 50% of the plants representing each cultivar was in bloom (total of 26 weeks in the trial).

Color--Type	No. of cultivars	No. of wks in bloom
White--all	10	21
White--clear	5	22
White--blotch	5	20
Yellow--all	12	20
Yellow--clear	5	21
Yellow--blotch	7	19
Orange--all	7	10
Orange--clear	3	10
Orange--blotch	4	10
Rose--all	7	18
Rose--clear	2	16
Rose--blotch	5	19
Red--all	5	17
Red--clear	1	17
Red--blotch	4	17
Blue--all	12	17
Blue--clear	5	19
Blue--blotch	7	16
Purple--all	6	18
Purple--clear	3	16
Purple--blotch	3	20

Only two cultivars of dianthus had greater than 50% flowering during any of the 26 weeks of the trials.

Scala was the top performing pansy series in the 1995/1996 winter trials. Vernale and Accord were all top performers as well. These top three series are good choices, but notice that 50% of the Vernale plants were in flower only an average of 13 weeks out of 26 whereas the 10 Accord cultivars averaged 20 weeks with 50% or more of the plants in flower (Table 2). Since full season flowering is such an important landscape performance feature, we have summarized average number of weeks with 50% or more of the plants in flower by flower color and type in Table 3. White cultivars appear to be the most consistent in flowering, while orange cultivars are significantly less floriferous than any other flower color. Yellow flowering cultivars are close behind whites in performance, and purple, blue, red, and rose cultivars are grouped closely together following yellow cultivars. Within a given color, there appears to be little difference between clear and blotched flowers. This information may be useful to landscapers seeking

As indicated by the low rating for the Chimes series, snapdragons were severely injured during our winter in 1996. However, in about three out of every four winters in Raleigh, snapdragons will overwinter and produce attractive early spring color in the landscape.

A NEW SILVER BULLET?

Ron Jones, Department of Plant Pathology, NCSU

Recently a very attractive, full-color brochure was sent to me by a county agent extolling amazing disease control by Timsen. He asked why N. C. State was not recommending this great product. Timsen was new to me. Timsen (EPA Reg. No. 507-3-66784) is a quaternary ammonium chloride disinfectant - sanitizer - deodorant. It is registered for use on shopping baskets, tables, shelving, cutlery, pots, pans, tools, containers, cold rooms, warehouses, refrigerated showcases, kitchens,

toilets, drains, trucks, and dumpsters. It is not labeled for use on plants, soil nor in greenhouses. It was last registered for sale in North Carolina in 1993. Therefore, it is not legal to sell Timsen in the state. Quaternary ammonium chloride products are good disinfectants and they have been around for many years, but they have no uses on plants or soil for plant disease control. The old adage still holds - if it sounds too good to be true, beware. Just because it has a nice color brochure, does not make it a true "silver bullet."

NCCFGA NEWS

By now most of you are through the summer season and probably heavy into garden mums, pansies, and poinsettias for the upcoming autumn. There is no "slow season" for us any more.

Bedding Plant Field Day was a tremendous success. The trials looked very good, especially the fantastic collection of coleus being grown. There were over 230 attenders, so many folks took the opportunity to come and see the trials as well as attend the afternoon educational sessions.

New board members and officers were elected at the general membership meeting held during Bedding Plant Field Day. During the general membership meeting, it was recommended and adopted that the secretary and treasurer offices be combined to form a secretary / treasurer position. This seemed logical, as Bonnie is taking over many of the duties of both the former secretary and treasurer offices. In other Association business, it was approved that officers and board members will serve from a starting date of the Bedding Plant Field Day each year, since this is the time agreed upon to hold our annual membership meeting. A listing of your officers and board is given on the next page; welcome to our new board members. Please contact any of us with your concerns and suggestions to help make NCCFGA better and stronger.

Thank you to outgoing board members Wayne Childers, Ellis Lay, Eileen Little, and Steve Sorrells; and outgoing immediate past-president Bob Luther for their contributions and hard work while serving on the board. We also want to express our appreciation to former treasurer Joe Stoffregen who has served in that capacity for many years. His hard work and dedication to the NCCFGA is outstanding and is deeply appreciated. Congratulations to Joe now serving as our president-elect.

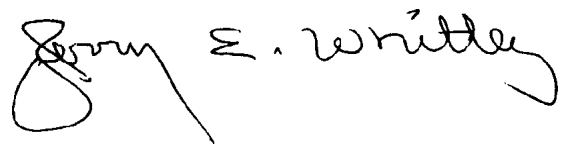
Good news from N.C. State--they will be able to fill the position to be vacated when Roy Larson retires at the end of August. We appreciate

the work of Dr. Monaco and others in the Horticultural Science Department to help preserve the support our industry so desperately needs. It will be very difficult if not impossible to find someone to match the dedication and assistance that Dr. Larson gave to the growers of North Carolina as well as the students at N.C. State. He will be sorely missed and we wish Roy well in his upcoming retirement. We are pleased that he will be continuing with the poinsettia trials during this season and hopefully in following years as well.

We are concerned over declining NCCFGA membership and have appointed a committee to look into recruiting and retaining new members. Our eight year membership history (from 1989 to 1996) is: 111, 189, 227, 271, 226, 178, 212, and 199 paid members, respectively. We would like to achieve and surpass our 1992 membership of 271 and are looking for suggestions to improve the Association. Any thoughts or suggestions on what we can do to increase our membership? Are there services you think we can provide that would attract more folks? What are we doing right and what can we improve? What can we do for you? Let us know; we truly need your input.

Plans for the 1997 Green & Growing Show are under way, and NCCFGA will once again be cosponsoring the event. We will be conducting a growers' session on bedding plant production on Friday, 10 January 1997 so mark your calendars now and plan to attend. This show is an excellent opportunity for growers to exhibit their products for retailers and landscapers, so you may want to exhibit as well as attend the educational sessions.

Please let us know what's on your mind. This is your Association, and we welcome your opinion! Until next time,



Jerry E. Whitley, NCCFGA President

1996-97 OFFICERS AND BOARD OF DIRECTORS

Officers

President: Jerry Whitley

*Metrolina Greenhouses
16400 Huntersville-Concord Road
Huntersville, NC 28078
Ph. (704) 875-1371 / FAX (704) 875-6741*

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10809 Honeycutt Road
Raleigh, NC 27614
Ph. (919) 847-0117*

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Board of Directors

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*Baucom's Nursery Co.
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Charlotte, NC 28229-5558
Ph. (704) 596-3220*

Sandy Cruise (1998)

*Metrolina Greenhouses
16400 Huntersville-Concord Road
Huntersville, NC 28078
Ph. (704) 875-1371 / FAX (704) 875-6741*

Frank Dailey (1999)

*Rockwell Farms, Inc.
6055 Highway 152 East
Rockwell, NC 28138
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Ph. (704) 525-7723 / FAX (704) 525-1725*

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Pantego, NC 27860
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517 Roundtree Road
Charlotte, NC 28217
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*Velvet Ridge Greenhouses
P.O. Box 6826
Asheville, NC 28816
Ph. (704) 254-3376 / FAX: (704) 254-3513*

NCCFGA Executive Secretary: Bonnie Holloman

*NCCFGA
8600 Crowder Road
Raleigh, NC 27603
Ph. (919) 779-4618 / FAX (919) 779-1685*

NCCFGA Educational Advisor: Douglas Bailey

*Box 7609 Dept. of Horticultural Science
North Carolina State University
Raleigh, NC 27695-7609
Ph. (919) 515-1195 / FAX (919) 515-7747
e-mail: doug_bailey@ncsu.edu*



**NORTH CAROLINA
COMMERCIAL FLOWER GROWERS' ASSOC.**

**DOUGLAS A. BAILEY, EDITOR
DEPARTMENT OF HORTICULTURAL SCIENCE
NORTH CAROLINA STATE UNIVERSITY
BOX 7609
RALEIGH, NC 27695-7609
(919) 515-1195 FAX (919) 515-7747
INTERNET: doug_bailey@ncsu.edu**

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