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The **MAYFLOWER**

Massachusetts Flower Growers' Association

Growers of Quality Plants and Flowers

**2006-2007
No. 2 of 6**

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**UMass Extension Floriculture Water Quality Project: II
pH, Alkalinity, Calcium, Magnesium
and Other Elements**

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In 2004 the UMass Extension Floriculture Program began a project studying greenhouse irrigation water quality supported by the Massachusetts Flower Growers' Association, Ball Seed Co., and The Scotts Testing Laboratory. In an earlier issue of *The Mayflower* (Cox, et al., 2006) we reported on the sodium, chloride, and EC levels found in the tests from our study. This article reports on the results of testing for pH, alkalinity, calcium (Ca), magnesium (Mg), and other elements. Water pH and alkalinity can have important effects on nutrition and crop quality of many annuals especially marigold, geranium, calibrachoa and petunia.

Over 50 growers in all regions of Massachusetts chose to participate in this project. Cooperating growers were asked to provide information about their water source, the crops they produce, their fertility program, and their testing history. Water was sampled and analyzed several times over two years. Analyses included pH, alkalinity, electrical conductivity (EC), and mineral composition. The tests were made by The Scotts Testing Laboratory and Paul Lopes and Tina Smith helped the growers with test interpretation and gave advice based on the results.

In addition to providing useful information for growers, the water analysis data also gave us an opportunity to look at greenhouse irrigation water quality from different sources and in different regions of Massachusetts.

How the results are tabulated

Test results from a total of 183 water samples collected from about 50 growers in spring of 2004 and again in 2005 are reported in this article. It is important for the reader to know that the sample totals shown in the table includes results of as many as 2-4 tests from some growers taken at different times during the sampling period.

The importance of pH and alkalinity in iron nutrition and iron/manganese toxicity is well known and in some cases the lack of Ca and Mg in water is a factor in occurrence of plant deficiencies of these elements.

Table 1 shows accepted greenhouse irrigation water target and acceptable ranges for pH, alkalinity, Ca, and Mg. Compare these ranges to the water test results shown in Tables 2, 3, and 4. Water test results for other elements (nitrate, ammonia, phosphate, potassium, sulfate, iron, boron, copper, manganese, and zinc) are summarized at the end of the article.

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Table 1. Greenhouse water analysis interpretation for pH, alkalinity, Ca, and Mg (Biernbaum,1994).

Factor	Target range	Acceptable range
pH	5.5-7.0	4-10
Alkalinity (ppm)	40-160	0-400
Ca (ppm)	25-75	Less than 150
Mg (ppm)	10-30	Less than 50

Table 2 shows the state-wide water test results from municipal, well, and surface water sources. Municipal, refers to public drinking water originating from a surface body of water or from wells provided by a city, town, or other authority (like the MWRA). Well, refers to a private well owned by the grower. Surface, refers to water from a private pond or perhaps pumped by the grower from a river; generally the surface water sources in this project were for irrigation only and not for drinking.

Tables 3 and 4 show test results from municipal sources and wells, respectively, broken down for convenience into easily recognized regions by Massachusetts counties. Of course, counties are just political divisions drawn on a map, so they don't have much to do with the water quality in a region. No samples were submitted from Suffolk county and only a handful were from the Cape and the Islands. There is not a table similar to Tables 3 and 4 for surface water because the number of samples collected for the whole state was very small (15).

Results - pH, alkalinity, Ca, and Mg

All water sources Water test results from all municipal, well and surface sources are compared in Table 2. The average pH of all sources was well within the acceptable range, but slightly above the target range, (Table 1) for greenhouse irrigation water. Most pH test results fell between 7.0 and 7.9. Minimum pH levels were within the acceptable and target ranges whereas pH levels at or near the maximum level were well above the target range. It is not surprising that many Massachusetts greenhouses have water pHs somewhat above target; it is generally not a concern unless the water also tests above target for alkalinity.

In fact, the average alkalinity of all water sources was close to the low end of the target range. Even the maximum recorded alkalinity levels fell within the target range for municipal and surface water, but a few well water samples had alkalinity levels above target. Overall, the alkalinity of 75% of all samples tested in the target range or lower.

Calcium and magnesium levels in most samples taken from all three water sources were within or somewhat below the target range for greenhouse irrigation water. Only in a few well water samples did Ca and Mg levels significantly exceed the target range. These samples also had high pH and alkalinity, factors of greater concern than high Ca and Mg from a crop growth and quality standpoint. More important were the many water samples that had low Ca and Mg levels reflected by the low average and minimum values for both elements in Table 2. Use of a water-soluble fertilizer supplying Ca and Mg to prevent deficiencies would be a desirable practice to adopt in many of these greenhouses.

Municipal water In Table 3 municipal water tests for pH, alkalinity, Ca, and Mg are compared by region. In all regions, the average pH was slightly higher than the target range. Average alkalinity was within the target range in all regions except Worcester county where it was somewhat lower than target.

Ca and Mg levels were lower than or just short of the target range, in all regions. High pH, at or near the maximum, was a potential problem in a few cases, however these high pH values were not coupled with high alkalinity above the target range. Potential problems might exist where Ca and/or Mg was low. Water tested from a few greenhouses had very low Ca, at or near the minimum, and 75% of all samples in all regions tested low for Mg.

Well water Well water tests were similar to municipal tests in that pH was somewhat above the target range, (Table 4). Berkshire county had the highest average pH of 7.8. In each region pH of well water from several greenhouses tested 8.0 or above raising concerns about the response of species sensitive to too high pH.

Significant differences between regions were found in the levels of alkalinity, Ca, and Mg in well water samples. Berkshire county and the Franklin, Hampshire, and Hampden region had the highest average and maximum alkalinity levels compared to the other regions. Average and maximum levels of Ca and Mg were highest in Berkshire county. High pH, alkalinity, Ca, and Mg is common in well water sampled in Western Massachusetts, especially in Berkshire county due to underlying limestone deposits. From a crop production standpoint the coupling of high pH and high alkalinity is of greatest concern.

Results - Other elements

In addition to pH, alkalinity, Ca, and Mg (and EC, Na, and Cl reported earlier [Cox, et al. 2006]), we also tested water for other elements: nitrate, ammonia, phosphate, potassium, sulfate, boron, copper, iron, manganese, and zinc (chemical symbols: NO₃, NH₃, PO₄, K, SO₄, B, Cu, Fe, Mn, and Zn). In general, regardless of water source or

region, the average level of each of these elements fell in the target range, and the broader acceptable range, for greenhouse irrigation water (data not shown).

In a few cases, almost exclusively in well or surface water, some elements were found at quite high levels. For example, in three or four cases NO₃ exceeded the USEPA standard of 10 ppm for drinking water. While water with NO₃ exceeding this limit poses no threat to greenhouse crops, drinking this water would be unhealthful. Also, a well or a pond containing a high level of NO₃ might be an entry point for groundwater pollution. In another example, high levels of K and PO₄ were found. The levels were high enough to warrant a reduction of fertilizer K and PO₄ levels to account for the extra applied to crops from the irrigation water alone.

Finally, some growers believe that the presence of Fe and Mn in their water might contribute to Fe/Mn toxicity affecting species like marigold and geranium. In almost every sample we collected Fe and Mn levels were well below the target range, for greenhouse irrigation water. This finding suggests that fertilizers and growth media are the more likely sources of too much Fe and Mn rather than irrigation water.

Summary

Most growers in Massachusetts seem to be irrigating with water of normal or near normal pH and levels of alkalinity, Ca, Mg, and other elements. A few growers, especially in Western Massachusetts using private wells or ponds, face the challenge of crop productions with high pH and high alkalinity water. The twin problem of high pH and high alkalinity can be solved by use of acidic fertilizers or, in extreme cases, by irrigation water acidification. However, the use of acidic fertilizers or acidified water should be limited to calibrachoa, petunia, and other acid-loving plants. Our study revealed a more common, but more subtle problem: the existence of low or borderline levels of Ca and very low Mg. Apart from water, limestone is the only other source of Ca or Mg for greenhouse crops unless a fertilizer containing Ca and Mg (i.e., EXCEL) is used or supplemental applications of calcium nitrate and/or magnesium sulfate are made. It's been well-established that poinsettias need extra Ca to prevent bract necrosis and extra Mg, as well, to prevent leaf chlorosis. Many experts think that other crops could

Table 2. pH, alkalinity, Ca, and Mg levels in greenhouse water samples from three sources (all regions).

Water source	Samples	Average	Minimum	Maximum	75% ^z
pH					
Municipal	82	7.6	6.3	8.8	7.9
Well	86	7.3	5.4	9.9	7.9
Surface	15	7.2	6.5	8.0	7.6
Alkalinity, ppm					
Municipal	82	50	4	124	70
Well	86	67	8	262	90
Surface	15	48	12	158	72
Calcium (Ca), ppm					
Municipal	82	21	2	138	25
Well	86	38	1	701	33
Surface	15	20	6	43	25
Magnesium (Mg), ppm					
Municipal	82	4	0.1	31	6
Well	86	11	1	181	12
Surface	15	6	1	13	8

^z75% of the samples analyzed had levels lower than the value shown (25% had higher levels).

benefit from Ca and Mg even though the appearance of dramatic deficiency symptoms is not common. Solving the problem of low Ca and Mg is easy to do by careful fertilizer selection.

References

Biernbaum, J.A. 1994. Water quality. In Tayama, H.K., T.J. Roll, and M.L. Gaston. Eds. Tips on growing bedding plants, 3rd ed., Ohio Flor. Assoc., Columbus, OH.

Cox, D.A., P. Lopes, and T. Smith. 2006. UMass Extension floriculture water quality project: I. Salinity, sodium, and chloride. The Mayflower. 2005-2006, No. 6 of 6-2, pp. 1-4.

Table 3. pH, alkalinity, Ca, and Mg levels in greenhouse municipal water samples.

Region (counties)	Samples	Average	Minimum	Maximum	75%
	pH				
Berkshire	13	7.8	7.4	8.1	7.9
Franklin, Hampshire, Hampden	15	7.5	6.5	8.3	8.1
Worcester	11	7.2	6.5	7.8	7.4
Middlesex, Essex	20	7.5	6.7	8.3	7.8
Norfolk, Plymouth, Bristol, Barnstable	23	7.6	6.3	8.8	7.9
	Alkalinity, (ppm)				
Berkshire	13	44	14	90	78
Franklin, Hampshire, Hampden	15	53	18	96	69
Worcester	11	27	14	81	33
Middlesex, Essex	20	63	16	116	96
Norfolk, Plymouth, Bristol, Barnstable	23	45	4	124	62
	Calcium (Ca), ppm				
Berkshire	13	13	4	25	24
Franklin, Hampshire, Hampden	15	23	10	42	31
Worcester	11	24	3	138	20
Middlesex, Essex	20	22	2	58	36
Norfolk, Plymouth, Bristol, Barnstable	23	17	2	49	23
	Magnesium (Mg), ppm				
Berkshire	13	4	1	8	7
Franklin, Hampshire, Hampden	15	4	1	11	3
Worcester	11	4	1	31	5
Middlesex, Essex	20	5	0.1	10	8
Norfolk, Plymouth, Bristol, Barnstable	23	4	1	10	6

*75% of the samples analyzed had levels lower than the value shown (25% had higher levels).

Table 4. pH, alkalinity, Ca, and Mg levels in greenhouse well water samples.

Region (counties)	Samples	Average	Minimum	Maximum	75%
	pH				
Berkshire	17	7.8	7.0	8.2	8.1
Franklin, Hampshire, Hampden	5	7.1	6.6	7.4	7.3
Worcester	19	7.3	5.4	8.2	8.1
Middlesex, Essex	11	7.4	6.0	8.1	7.7
Norfolk, Plymouth, Bristol, Barnstable	34	7.2	5.9	9.9	7.7
	Alkalinity, (ppm)				
Berkshire	17	148	84	262	218
Franklin, Hampshire, Hampden	5	122	16	264	158
Worcester	19	44	16	81	56
Middlesex, Essex	11	67	14	160	92
Norfolk, Plymouth, Bristol, Barnstable	34	31	8	80	44
	Calcium (Ca), ppm				
Berkshire	17	80	18	701	60
Franklin, Hampshire, Hampden	5	27	1	61	50
Worcester	19	21	9	56	28
Middlesex, Essex	11	30	7	82	32
Norfolk, Plymouth, Bristol, Barnstable	34	30	2	424	23
	Magnesium (Mg), ppm				
Berkshire	17	25	9	106	27
Franklin, Hampshire, Hampden	5	7	1	16	13
Worcester	19	3	1	7	5
Middlesex, Essex	11	6	1	16	7
Norfolk, Plymouth,	34	11	2	181	7

*z*75% of the samples analyzed had levels lower than the value shown (25% had higher levels).

2006 Long Island Trial Garden Review

Nora Catlin, *Floriculture Specialist, Cornell Cooperative Extension of Suffolk County*

While some plants in the annual trial garden are still blooming (at the time of this writing), it is time to wrap up the garden season. To review the season, Ball FloraPlant, Fischer USA and Goldsmith Seeds, Proven Winners and Proven Selections, S&G Flowers, and Selecta First Class submitted 189 cultivars to the 2006 trial. Plugs were received throughout April and potted into 4" pots. All plants were maintained in the greenhouse, fertilized with a constant liquid feed of 20-10-20, pinched as necessary, and treated with insecticides and fungicides as necessary. In early spring, the flower beds were cultivated and a fine mulch was incorporated into the soil. Prior to planting, the beds were again cultivated and fertilized (10-10-10).

Plants were moved outside to harden off for approximately one week before being planted in the ground on June 1. The flower beds are located in a full sun, exposed and windy site. After planting, the beds were mulched with double-ground wood chips for weed control and moisture retention. The beds were irrigated with overhead irrigation when needed, and fertilized twice during the season with a liquid feed (20-20-20, 250 ppm). Plants were not dead-headed throughout the season. All cultivars were evaluated every two weeks (starting the week of June 26 and ending the week of August 21) by three individuals. Flower display, foliage quality, uniformity of plot, and overall impact were rated on a scale of 0 to 5 (0 = lowest rating) and averaged to determine the plant rating. An average plant rating was determined from the plant ratings of the three evaluators, and a season-long average rating was determined.

Top performing plants in this year's trial are listed below. Based on the season-long average, the top performing plants throughout the season and the top five performing new introductions were selected. For plants for which more than five cultivars were submitted, the top performer for each plant was selected. Attendees of the Floriculture Open House (July 6) and Long Island Plant Science Day (August 22) also selected favorites which are listed in the August 2006 and September 2006 issues of *Long Island Horticultural News*.

Many thanks to all who supported the trials: the participating companies who provided plants and support for the trial; the generous growing media donations from Premier Horticulture and mulch donations from Southold Town Compost; the Cornell Cooperative Extension and LIHREC staff who helped with the evaluation and maintenance of the trials; and the Master Gardeners who donated their time.

If interested in more trial garden details, look for the complete report and pictures that are posted online at www.cce.cornell.edu/suffolk.

Top performing plants throughout the season:

Petunia 'Plush Lilac Pearl' (New, S&G Flowers)
Sanvitalia 'Sunbini Improved' (Proven Winners)
Chrysocephalum 'Flambe Yellow' (New, Proven Winners)
Petunia 'Whispers Appleblossom' (GoldFisch by Goldsmith Seeds)
Petunia 'Plush Deep Pink' (New, S&G Flowers)
Petunia 'Plush White' (New, S&G Flowers)
Salvia 'Mystic Spires Blue' (Ball FloraPlant)
Petunia 'Jamboree White II' (GoldFisch by Goldsmith Seeds)
Petunia 'Whispers Rose Vein' (GoldFisch by Goldsmith Seeds)
Cleome 'Senorita Rosalita' (New, Proven Winners)
Petunia 'Jamboree Hot Pink' (GoldFisch by Goldsmith Seeds)

Top Five Performing New Introductions:

Petunia 'Plush Lilac Pearl' (S&G Flowers)
Chrysocephalum 'Flambe Yellow' (Proven Winners)
Petunia 'Plush Deep Pink' (S&G Flowers)
Petunia 'Plush White' (S&G Flowers)
Cleome 'Senorita Rosalita' (Proven Winners)

Top performing plant, when more than five cultivars were submitted:

Argyranthemum 'LaRita White' (New, Selecta First Class)
Calibrachoa 'Cabaret Lavender' (New, Ball FloraPlant)
Calibrachoa 'Cabaret Light Pink' (New, Ball FloraPlant)
Geranium 'Himalaya Fire Scarlet' (New, GoldFisch bred by Fischer)
Lantana 'Lucky Pot of Gold' (Ball FloraPlant)
Osteospermum 'Tradewinds Light Purple' (GoldFisch by Goldsmith Seeds)
Petunia 'Plush Lilac Pearl' (New, S&G Flowers)
Phlox 'Intensia Lilac Rose Improved' (Proven Winners)
Verbena 'Lanai Lavender Star' (GoldFisch by Goldsmith Seeds)
Vinca 'Nirvana Violet' (GoldFisch by Goldsmith Seeds)

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Dates to Remember

MFGA/UMass Winter Meeting

January 23, 2007

J.P. Bartlett Co. Sudbury

Mass Ag Day

March 23, 2007

State House, Boston

New England Greenhouse Conference and Expo

The New England Greenhouse Conference and Expo was held this year from November 1 thru November 3 at the DCU Centre (formerly the Centrum Center) in Worcester, MA and was attended by over 2,000 growers, retailers, and industry representatives from the New England States, Pennsylvania, New York and Canada. The conference is held every other year and is coordinated by Extension faculty and staff from the New England State Universities and Cornell University. Leaders of the grower associations from the six New England states and New York also participate in the planning process.

This year Tina Smith served as program chair and Paul Lopes served as treasurer and coordinator of the new crops display and the trade show demonstration sessions. Many University of Massachusetts Extension and PSIS faculty and staff contributed to the success of the conference. Dr. Douglas Cox was as a featured speaker and moderator, Dr. Rob Wick and Bess Dicklow coordinated the Disease Diagnostic workshop, Suzanne Lyon coordinated the Insect and Mite Identification workshop and was a featured speaker, Dr. Susan Han was a featured speaker, and Nancy Garrabrants and Chris Joyner served as moderators.

November 1st featured six pre-conference workshops and short courses on plant growth regulators, disease diagnostics, greenhouse pest management, perennial production, plant nutrition and retail garden center marketing. The trade show kicked off on the second day with over 150 exhibitors of exciting new plants and hard goods.

The second and third days featured several concurrent tracks of educational programs and trade show. On Thursday, educational sessions focused on greenhouse production, pest management, retail garden centers, business management and energy. Marketing was a hot topic at this year's conference: whether it was the panel "Can Organic/Sustainable Lawn and Garden Products and Plant Be a Successful Market", "Marketing to the Next Generation of Gardeners" or "Successful Marketing Despite Rainy Weather", garden centers operators learned tips to increase their bottom line. Thursday evening wrapped up with the popular "Garden Center Idea Exchange" which was enthusiastically moderated by Bill Calkins, Managing Editor of "Green Profit" magazine. Greenhouse management, pest management, alternative crops (including cut flower production and organic greenhouse production), marketing, and perennials were featured on the final day. Growers were abuzz listening to Eliot Coleman share his experience on "Winter Greenhouse Production of Salads and Root Crops without Heat", and Stephanie Cohen kept the crowd until the very end of

the conference with "Hot Powered Perennials" and a final book-signing. There were over forty educational workshops from which to choose over the three day conference.



Mass Sales Tax on Purchases

by Amalie Ann George, CPA, PC

It has come to the attention of the Massachusetts Flower Growers Association that some vendors are attempting to charge sales tax to growers on purchases of greenhouse products used in construction of greenhouses and the production of product for resale. According to Mass General Laws this is not legal. As members of MFGA you should be knowledgeable about the law outlined below and obtain the proper exempt certificate.

Growers, farmers and fishermen pay no tax on materials, tools and fuel they buy that are used or consumed directly and exclusively in agricultural production. Even though the sales and use tax law does not contain a definition of agricultural production, the Massachusetts Department of Revenue has determined that it uses the same definition as is applied in other sections of the Massachusetts General Laws. In Massachusetts Letter Ruling 85-64, 07/22/1985, which interpreted the agricultural exemption provided in Mass. Gen. L. Chapter 64H § 6(r), the Department determined that the definition of "agricultural" found in M.G.L. Ch. 128, §1A should be used to apply to agriculture for sales and use tax purposes. In that section, agriculture is defined to include the production, cultivation, growing and harvesting of any agricultural, floricultural or horticultural commodities. Materials and supplies are considered to be consumed and used only if their normal useful life is less than one year or if the cost is an ordinary and necessary business expense for federal income tax purposes. In order to qualify for the exemption, farmers and fishermen must provide vendors with an exempt use certificate. Farmers and fishermen can also buy machinery and replacement parts tax free under similar terms and restrictions. [Mass. Gen. L. Chapter 64H § 8(e) ; Mass. Gen. L. Chapter 64H § 6(s) .]

Growers may obtain this exemption certificate by going to the following link <http://www.dor.state.ma.us/forms/FormsMenu2.htm>. The sales tax form ST-12 can be found under the category of sales, withhold holding, and wage reporting



MFGA Member Travels the USA!

Dear Friends and Industry Members,

Many of you know our 23 year old son Ben. He has always been interested in the industry and has been in greenhouses and gardens before he could walk. He had his own stand outside our house by the time he was in 3rd grade. Ben attended many of the industry trade shows since he was 11. He loved working for Churchill's Garden

Center in Exeter, NH. Now he is on an exciting adventure. On November 9th he began a cross-country trip "in search of the Great American Garden Centers" with his dog Rebel in an Airstream Trailer. He calculates his U.S.A. trip will take any where from 3 months to 3 years.

In many of our family discussions before he left, we discussed the great network this industry has. One of the reasons I am writing to you is—if you know of a garden center, nursery or greenhouse operation that you think Ben should visit - no matter the location - please let us know. Secondly, I am not a spammer, so if you would like to know periodic updates of where Ben has been and what he has seen - let me know and I will develop a list of people who want to know about America's Garden Centers from the next generation's prospective.

You can reach Ben directly at 1-603-520-5446 or Huntington7@yahoo.com

Thank you, Carol Huntington (Ben's Mom)

Pleasant View Gardens, 7316 Pleasant Street, Loudon, NH
1-603-435-8361 or CarolH@pvg.co



Integrated Pest Management and Weed Management for Herbaceous Perennials

Sponsored by University of Massachusetts Extension, University of Connecticut Extension and Northeast SARE

**January 16, 2007- 9:00 AM - 12:30 PM
Sturbridge Host Hotel, Sturbridge, MA**

Topics will include IPM strategies to control key insects, diseases and weeds for the major types of perennials produced as well as new and emerging pests and diseases. Learn how to use cultural controls, natural biological controls and environmentally friendly pesticides to produce healthy perennials—whether you are propagating perennials, growing them on in your greenhouses, producing container-grown perennials outdoors or selling perennials from your retail garden center.

Registration is \$20 per person including educational materials and continental breakfast. Financial support is provided by a grant from Northeast SARE. Three pesticide recertification credits.

For more information, contact: Tina M. Smith,
413-545-5306, tsmith@umext.umass.edu

For Sale

1979 Ford 800-Nine Bay delivery truck
Standard transmission, gas, set up with shelving.
Former local town fire and rescue truck.
Great condition. \$3,000 or best offer.
Call Bob at 508-797-3237

Employment Opportunities

Cavicchio Greenhouses Inc. is a premier wholesale horticulture and landscape supply business in New England. Our continued expansion has created a number of significant employment opportunities at our family-owned and operated 200 acre facility in Sudbury, Massachusetts.

Please join us and contribute to our success in our team oriented, friendly, casual dress but dedicated and hardworking environment.

Nursery Sales Representative—Our Nursery area is looking for a Sales Person. Experience in the Green Industry, thorough knowledge of plant material, ability to prepare bids and provide quotes as well as coordinate selection and delivery of product is a must.

Landscape Supply Sales Representative—Our Landscape Supply area is looking for a Sales Person. Experience in the Green Industry and working knowledge of stone product, pavers, soils and fertilizers, the ability to prepare quotes and coordinate delivery of products is a must in this very fast-paced environment.

Landscape Supply Buyer—Our Landscape Supply area is looking for a Buyer of landscape products. Must have purchasing and green industry knowledge, be able to determine appropriate inventory levels, negotiate the best value and ensure quality control.

Landscape Supply Receiver—Our Landscape Supply area is looking for a Receiver. Must be able to coordinate incoming vendor deliveries, accurately and efficiently confirm delivery counts, coordinate proper placement in the landscape supply yard and properly code and tag all products, and maintain the inventory database.

**Please send your resume to: Human Resources
Cavicchio Greenhouses, 110 Codjer Lane
Sudbury, MA 01776, fax 978-443-5440
or e-mail to jobs@cavicchio.com**

Mass Ag In The Classroom

MFGA has been asked by to participate in Massachusetts Ag in the Classroom. The organization operates under the guidance of a 30-member volunteer Board of Directors. Board members represent Massachusetts' agricultural commodities, associations, state and Federal Agencies involved in agriculture education and awareness.

Participating in MAC requires attending regularly meetings and support of the organization in its efforts to make school-aged students more aware of agriculture in Massachusetts.

If you are a member of MFGA and would like to serve the MAC Board of Directors, please contact the MFGA office at 781-275-4811.

Growers Contribute to MFGA

Berry's Greenhouses, Inc., Medway
Bemis Farms Nursery, Spencer
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New Members

Debbie Athearn
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120 Meshacket Road, Edgartown, MA 02539

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