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Floral Notes Newsletter

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In This Issue

2009 Great Ideas Summer Conference

Sylvan Nursery, Westport, MA

Massachusetts Flower Growers Association & Massachusetts Nursery Landscape Association

Join Massachusetts' largest green industry associations - MFGA and MNLA - for their sixth annual collaborative event, the 2009 Summer Meeting and Trade Show on July 22, 2009 at Sylvan Nursery, Westport, MA.

Sylvan Nursery, Inc. is located on approximately 300 acres of prime land in southeastern Massachusetts where the climate assures the best possible growing conditions. All aspects of their nursery production have evolved with water and energy conservation in mind. For example, Sylvan installed catch basins to conserve water and to eliminate run-off, they use bark mulch in the B&B areas, and use drip irrigation on individual plants to save water. They have a 10-kilowatt wind tower and use a combination of wind and solar power.

Whether it is innovative exhibits, first-rate tours, or cutting edge education, all attendees are sure to be involved and inspired. Registration information will be available at www.mnla.com

For more information contact: Paul Lopes, (508)295-2212 ext. 24, lopes@umext.umass.edu, Tina Smith, (413)545-5306, tsmith@umext.umass.edu or Bob Luczai, bluczai@ballseed.com (978)952-0116.

Upcoming Educational Programs

June 17 Garden Mums & Pesticide Credits, J.P. Bartlett Co., Sudbury

August 26 Griffin Grower Expo, Eastern States Exposition Better Living Center, Springfeld

September 17 Using Biological Control in Greenhouses: Putting It All Together, Tolland County Extension Center, Vernon, CT

October 20 Plant Nutrition, Publick House, Sturbridge

Save the dates! Details of September 17 and October 20 programs will be provided later.

Project Update: Corn for Greenhouse Heat

Andy Cavanagh & Tina Smith
UMass Extension
Amherst

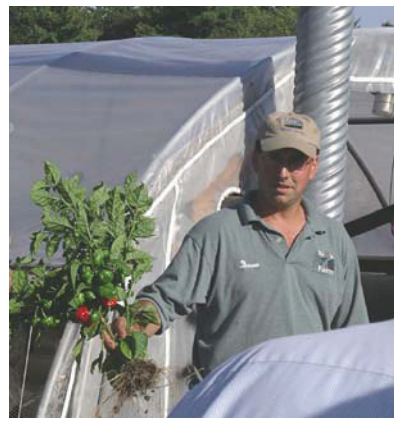
UMass Extension started a project in summer 2008 focusing on utilizing locally grown shelled corn as an alternative fuel to heat three greenhouses. Corn is a renewable fuel source that can be grown and used in Massachusetts more cheaply than fossil fuels, using available and proven technology.

The production of shelled grain corn was largely abandoned in New England because of cheap corn available from the Midwest. As the cost of corn from outside the region rises along with fossil fuels, the equation shifts. Several dairy and vegetable farmers who have returned to the production and use of shelled corn for feed or for heat are finding a positive net income from their investments. Vegetable farms that have started growing grain corn find benefits to their crop rotation systems, reduced costs of fuel for their greenhouses, as well as a new crop to sell.

The goal of this project is to help develop the links necessary between producers and users, and will evaluate the cost and benefits for both.

We are working with the vegetable and greenhouse flower growers and dairy farmers to build two model networks of producers and users that will work together to establish an economically viable, sustainable system for producing and/or using shelled corn as a crop for greenhouse heat. Participating growers in both Eastern and Western local networks have purchased, installed, and are starting to use biomass furnaces to heat their greenhouses with corn. All growers are recording the labor and other costs associated with using the corn furnaces so that cost and efficiency comparisons can be made. Remote temperature sensors have been deployed to track temperatures both inside and outside of the target greenhouses. David Dumaresq, owner of Brox Farm in Dracut and member of MFGA is one of the growers involved. Here is his story written by Andy Cavanagh of the UMass Extension Vegetable Program.

Brox Farm Case Study



Dave Dumaresq farms about 90 acres of vegetables and about 18,000 ft² of heated greenhouse space. He grows in his greenhouses for his Brox farm flower sales as well as his vegetable acreage which is marketed through his two farm stands, several farmers markets, some wholesale, and recently his own CSA. His overall farming operation name is Farmer Dave's. Farmer Dave's is a small seasonal New England Farm offering a wide array of flowers, fruits and vegetables. Farmer Dave's sells at farmers markets in Revere, Gloucester, East Boston, Lynn, Winchester, Boston, Wakefield, Chelsea, Dorchester, Andover, and Dracut. His two farm stands are Brox Farm in Dracut and the East Street Farm in Tewksbury. Dave started his CSA in 2007, with a total membership of 62. In 2008 he expanded to 340 members with distribution sites in Dracut, Gloucester, Lawrence, and Somerville.

Brox Farm itself began in 1902 as a typical small NE family farm. After WWII the last milking

cows left the farm and the focus shifted to fruit and vegetable production that would be marketed in the neighboring cities of Lowell and Lawrence as well as the Boston wholesale market.

In the 1970's a small farm stand was built on the Brox farm which is bisected by Rt. 113. Dave began working on the Brox Farm in 1983. While Dave was serving as a crop advisor with the Peace Corps in Ecuador, John Brox passed away and the Brox family asked Dave if he would like to operate the farm as his own business upon his return. Dave has been leasing the Brox Farm since 1997.

In 1999 Dave began his first farmer's market in Lawrence as he was growing a good array of Hispanic crops that found a ready market in the heavily Latino city. Since then he has added an average of one market per year. Also in 1999 he began growing bedding plants in addition to his vegetable plants. This improved the farm cash flow and allowed him to offer more winter employment, thus attracting better employees.

From 1998 to 2005 he expanded his greenhouse space from 1,800 ft² to 18,000ft². In 2003 he was asked to take over and lease the East Street Farm on the grounds of Tewksbury State Hospital. The East Street Farm includes 15 acres and a farm stand. In 2006 he purchased the 30 acre Leczynski APR Farm in Dracut. With the uncertainty of future leases, but the certainty of mortgage payments, Dave decided to start his CSA to help ensure the future viability of his farming operation in the event that he loses his leased farm stands.

Dave grows in seven greenhouses, all of which are 6 mm double poly, with poly being changed every 3-4 years and heated with oil. The greenhouses are used for annuals to sell and the vegetable starts for his farm. The first greenhouse that he opens up in late January is smaller 48' x 20' house that he uses for starting seeds and cuttings. The night temperature in this starter house is set at 70°F. He opens up another greenhouse every two weeks or so until late April, when all the houses are full. The night temperatures for the later houses run from 58-68°F, depending on what crops are in the house.

The greenhouse to which he plans to add the corn stove is a 30' x 96', double poly-covered hoop house. This greenhouse will be opened around February 15th and will contain mostly annuals, hanging baskets, and vegetable starts for the farm. He keeps this greenhouse at about 68°F night temperature. The greenhouse is currently heated with forced hot air from a 400,000 Btu Sebring oil furnace. This furnace was purchased new in 1999 for about $4,000. The unit is serviced by a professional every two years for a cost of about $95. Every other year Dave services the unit himself by changing the fuel filter, nozzle and cleaning out the unit. This furnace typically uses 1100-1500 gallons of oil per year. In 2007 the average cost for a gallon of oil was about $2.10, in 2008 about $3.10, in 2009 about $2.05. Dave wanted to reduce his heating cost, insulate himself from the drastic swings in oil prices, and move towards renewable fuel sources. Using a corn furnace to offset some of his oil use in his most heated greenhouse seemed like a good way to meet these goals.

One of Dave's original criteria for a corn stove was that it be portable – he wanted to be able to heat his farm stand through thanksgiving and Christmas season, when the stove would otherwise be idle. He looked at a few models and at first was interested in the Golden Grains Model 3101 portable stove. He first saw these stoves at the trade show in the New England Greenhouse Conference. These stoves are available locally from Amazing Flower Farm in New Ipswich, NH. They are listed as producing 15,000-170,000

BTUs when burning corn (Dave thought this may be a bit ambitious) and cost about $4,000. They come with standard hopper capacity of 150 pounds, and a larger hopper is available for an extra cost that extends the capacity to 300 pounds. It has pneumatic tires and folding handles to increase portability.

The problem Dave experienced with these stoves was that they need to be allowed to go out, cool down, and have the ash cleaned out of them on a daily basis. Dave felt that the daily maintenance outweighed the benefits of portability, and ultimately went with the LDJ Amaizing heat furnace. This unit is not readily portable, but should require less daily maintenance than the Golden Grains stove. He ordered the stove, an LDJ620-10R, from a local dealer in Sterling, MA, called 'Yellow's Green'. He also gets his corn from Yellow's Green, which he gets delivered for $235 per bulk ton.

In addition to the furnace, he got an extension for the hopper ($200) which increases its capacity to nearly a half ton and a corn vac ($521) to more easily transfer corn into the hopper. With the hopper extension he finds that in March he filled the hopper about once every 10 days. He keeps his corn furnace thermostat at 70°F and his oil furnace at 65°. On colder nights the oil furnace will maintain the minimum of 65°F. He is experimenting with setting these two temps closer but is finding that when the oil burner comes on it often leaves the temp 4 degrees above the 65°F setpoint. Therefore if it were set at 67°F it would trigger the corn burner to turn off frequently.

Dave finds lighting the furnace to be a fairly straightforward affair, though certainly more work than with his oil furnace. He starts with a small pile of wood pellets and a squirt of gelled fire starter. The wood pellets ignite at 400°F vs. the 1000°F needed to get corn started, so it makes for sort of a 'nurse' fire. When the wood pellets are burning nicely, he switches the furnace to 'start', and it begins slowly dribbling in more corn. After 4-5 minutes, he can switch the furnace to 'on' and walk away.

One potential problem that he's noticed relates to the idle mode of the furnace. To stay lit, the furnace dribbles a small amount of corn into the fire pot all day long, even when the thermostat isn't calling for heat. On sunny days, it gets hot enough to start the exhaust fans. Sometimes when this happens air gets sucked through the chimney of the furnace, causing smoke to come out of the air intake on the furnace - basically reversing the draft. The front end wall near the furnace is still sealed up in plastic until April, so this will be less of a problem as the greenhouse gets opened up more.

After more than a month of heating with corn Dave finds that the hopper extension, digital thermostat, and corn vac were excellent additions. While the corn vac does not work fast, it can be set up to transfer corn and be left on its own while transferring. For next season, Dave is considering buying a bulk tank to set up outside the greenhouse and have corn delivered into the bulk tank instead of having to deal with moving a pallet bulk bag of corn to the greenhouse when the hopper runs low. With the bulk tank(s) next to the greenhouse the corn vac can be used to transfer corn inside the greenhouse when needed. This will eliminate the hand labor needed without the corn vac.

Dave is hoping that the ability to accept larger deliveries of bulk corn will also lower the price of delivered corn. He will try to adjust his oil burner so that he can utilize both burners in better concert with each other. The digital thermostat also allows the two burners to be used better in unison. The digital thermostat will also allow Dave to adjust the temperature setpoint throughout the day and experiment with early morning DIF to further lower his heating costs. Overall, the corn furnace has been an easy addition to his operation. It will make his farming operation "greener"; create more demand for local corn, strengthening local agriculture, and it will help to stabilize his costs of production.
http://www.umass.edu:80/agland/greenenergy/FarmerDaves.html (this website also includes a short video)

Nitrogen and Water Loss by Leaching from Different Composted Cranberry Pomace Media

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Cranberry pomace compost has been successfully used to produce hardy mums, flowering hanging baskets and mixed containers of flowering annuals in Massachusetts. These grower trials have shown the promise of using cranberry pomace as a component in growing media and have familiarized growers with its use. Projects at UMass studying plant growth response to pomace mixes under controlled conditions have also shown positive results (Cox, 2008a; Cox, 2008b; Cox and Lopes, 2007).

During the course of my work at UMass I noticed that growing media consisting of high percentages of cranberry pomace tended to drain more rapidly following watering and dry out faster compared to a commercial peat-based medium and other pomace media containing lower levels of pomace. One issue of concern about using composts is what, if any, contribution do composts make to nutrient leaching and runoff. Problematic levels of nutrient leaching could occur from a compost potting mix if it's too "rich" in natural nutrient content and/or if it doesn't retain well nutrients applied from water-soluble fertilizers.

This article looks at nitrogen and water loss by leaching from 4-inch geraniums as it relates to plant growth, cranberry pomace media formaulation, and media physical properties. This project was supported by a grant from New England Floriculture, Inc.

How the plants were grown

Two types of composted cranberry pomace were tested. One type consisted of pomace composted in the open in a static pile for nearly 3 years ("old") resulting in a dark brown material of granular consistency. The initial pH and EC of this material was 5.5 and 0.57 mmho/cm. The second type of pomace was about 6 months old ("new") after composting in the open in a static pile. New pomace compost was light brown in color and some seeds and fruit skins could still be seen. The initial pH and EC of this material was 5.8 and 0.88 mmho/cm. The physical properties (bulk density, air-filled pore space, container capacity, and total porosity) of the growth media were measured before planting and will be discussed later.

Plug seedlings of 'Elite Red Geranium' were obtained from a commercial propagator and potted on 23 September 2008 in 4-inch plastic pots of Fafard 3B commercial mix or different media made with cranberry pomace. Pomace media were formulated with old or new pomace at levels of 100% or 50% pomace by volume. The 50% medium contained 40% sphagnum peat moss and 10% coarse perlite. Dolomitic limestone at 5 lb. /yd^3 was added to the pomace media.

The method of watering and fertilizing was designed so that the same amount of water and fertilizer was applied to all plants regardless of growing medium. Plants were watered at two to four day intervals as needed. At each watering the same volume of water soluble fertilizer or plain water was applied to plants in all treatments. The fertilizer solution was made by dissolving Plantex® 20-2-20 to supply 200 ppm N. Over the course of the growing period each plant received 740 milligrams (mg) of N and 4610 milliters (ml) (156 fl. oz.) of water per pot.

Pots were suspended through the lids of larger containers to collect the leachate as the plants grew. At 10 day intervals the leachate volume was measured and ammonium-N (NH_4-N) and nitrate-N (NO_3-N) concentrations were measured to calculate the amount of N leaching from each pot. Days from potting to flowering were recorded and at harvest (24 November), 60 days after potting, plant height, plant diameter, leaf area (area of the single leaf at the base of the first flower stalk), flower stalk length, and shoot dry weight were measured.

Results

Plant growth. Geranium plants growing in both types of cranberry pomace and Fafard 3B were largely indistinguishable from one another. There was no difference in time to flower among the treatments (Table 1). However, growth measurements revealed that plants grown in Fafard 3B or with either level of new pomace were taller and of greater diameter, and weighed more than plants grown with old pomace. The flower stalks of plants grown with Fafard 3B or new pomace were longer than the stalks of old pomace plants. Plants grown with new pomace had the largest leaves of all treatments. Overall, plants grown with new pomace grew more than those with old pomace. Pomace level, regardless of pomace age, had no effect on plant growth other than greater shoot dry weight with 100% pomace. In general, the growth responses of geranium in this study were similar to those described in an earlier article (Cox, 2007).

Table 1. Growth of 'Elite Red' geranium in different composted cranberry pomace.

Growing medium	Days to flower	Height (cm)	Plant diameter (cm)	Leaf area (cm^2)	Flower stalk length (cm)	Dry weight (gm)
Fafard 3B	48ns[z]	21.9ab	29.6a	96.1bc	18.6ab	12.7a
100% Old pomace	45	19.3b	26.5b	89.5c	17.3b	8.9c
50% Old pomace	46	19.9b	28.1ab	92.0c	17.1b	10.4b
100% New pomace	48	22.6ab	29.7a	122.6a	20.0a	11.9a
50% New pomace	46	24.0a	29.7a	119.1ab	19.1a	13.2a
Old pomace	46	19.5	27.3	90.8	17.2	9.7
New pomace	47	23.3	29.7	120.9	19.6	12.6
Significance[y]	ns	**	**	**	**	**
100% pomace	47	20.9	28.8	105.6	18.1	11.8
50% pomace	46	21.9	28.1	106.0	18.6	10.4
Significance	ns	ns	ns	ns	ns	**

[z]Means followed by different letters are statistically different at P=0.01or not significant (ns).
[y]Pair of means are statistically different at P=0.01 (**) or not significant (ns).

Nitrogen leaching. The amount of NH_4-N, NO_3-N, and the total of both N forms which leached during the experiment was greatest where plants were grown with 100% old pomace and least with the Fafard 3B and 50% new pomace treatments (Table 2). Nitrogen leaching from the 50% old pomace and 100% new pomace treatments was less than 100% pomace but greater than Fafard 3B and 50% new pomace. Overall, more N leaching occurred with media containing old pomace and from media containing 100% pomace. Despite the differences in leaching loss of N between growing media, the level of N found in the leaves did not significantly differ among treatments.

Total leachate volume was greatest was greatest in 100% pomace regardless of pomace age. Significantly less N leached with 50% pomace regardless of age and the least N leaching occurred when plants were grown in Fafard 3B.

Growth medium physical properties. Most growers are familiar with the term "bulk density" as the weight of a cubic foot of potting media. Bulk density (BD) of commercial media is generally the moist weight of the mix. The procedure used in this project measured BD as the weight of dry mix. Fafard 3B was the heaviest growing medium, followed by the media made from old pomace, and the lightest media were the two made from new pomace (Table 3). Using new pomace for tall plants in small containers might cause a stability problem, but otherwise the dry BDs were very typical of media used in the greenhouse.

Table 2. Nitrogen leaching from pots containing different composted cranberry pomace media used to grow 'Elite Red' geranium.

Growing medium	NH_4-N (mg/pot)	NO_3-N (mg/pot)	Total N (mg/pot)	Foliar N (%, dry wt.)	Total leachate volume (ml)
Fafard 3B	52.6c[y]	129.1c	181.7c	5.14ns	372c
100% Old pomace	178.8a	280.6a	459.4a	4.96	1363a
50% Old pomace	98.5b	179.5b	278.1b	5.29	784b
100% New pomace	94.1b	223.5b	323.8b	5.17	1296a
50% New pomace	56.5c	118.9c	175.4c	5.36	621bc
Old pomace	138.6	230.1	368.8	5.13	1073
New pomace	75.3	171.2	249.6	5.26	958
Significance[y]	**	**	**	ns	ns
100% pomace	136.4	252.1	391.6	5.07	1330
50% pomace	77.5	171.2	226.8	5.33	702
Significance	**	**	**	ns	**

[z]Means followed by different letters are statistically different at *P*=0.01or not significant (ns).
[y]Pair of means are statistically different at *P*=0.01 (**) or not significant (ns).

Air-filled pore space (AFP) is pore space which drains quickly after watering and is then occupied by air. For any given growth medium AFP increases as container height increases. Container capacity (CC) is the pore space which retains water after free drainage. The measurements AFP of all the media in this study were in the desirable range for greenhouse media, but significant differences in AFP did occur among the media. Regardless of compost age, 100% pomace media had greater AFP than Fafard 3B and the 50% pomace media (Table 3). Thus, mixing peat moss with the pomace to create the 50% pomace treatments reduced AFP. Fafard 3B had a higher CC than the pomace media, but there were no differences in CC among pomace media.

Table 1. Physical properties of composted cranberry pomace media.

Growing medium	Dry bulk density (lbs/ft^3)	Air-filled pore space (%)	Container capacity (%)	Total pore space (%)
Fafard 3B	9.3a[z]	8.5c	79.3a	87.7a
100% Old pomace	7.9b	11.8b	72.5b	84.3a
50% Old pomace	6.7c	8.7c	70.2b	78.8b
100% New pomace	6.1d	16.4a	71.0b	87.4a
50% New pomace	5.8d	10.2bc	70.8b	81.0b
Old pomace	7.5	10.2	71.3	81.5
New pomace	6.3	13.3	70.9	84.2
Significance[y]	**	**	ns	ns
100% pomace	6.9	14.1	71.8	85.9
50% pomace	6.3	9.4	70.5	79.9
Significance	**	**	ns	**

[z]Means followed by different letters are statistically different at *P*=0.01.
[y]Pair of means are statistically different at *P*=0.01 (**) or not significant (ns).

Total pore space (TP) is the sum of AFP and CC. The desirable TP for greenhouse media is 75 to 85% (this means that 75-85% of a pot of typical soilless media is space occupied by water or air and only 15-25% of pot volume is solids). The TP measurements of all the media were in the desirable range. Mixing peat moss with pomace significantly reduced the TP compared to the other media.

What does it all mean?

Geranium plants grown in a commercial soilless medium, Fafard 3B, and four different media formulated with composted cranberry pomace received the same amount of N from 20-2-20 fertilizer and water over a period of 60 days in length after planting. Nitrogen and water loss by leaching were significantly greater when plants were grown in media consisting of 100% old or 100% new compost compared to Fafard 3B and 50% compost media. The greater N and water loss might be explained by less plant growth in the case of the 100% old pomace treatment where shoot dry weight was much less. Also, in both 100% pomace treatments, less root growth was apparent when the pots were removed. The root systems were healthy, but less developed compared to Fafard 3B. Samller plants and root systems take up less water and nutrients leading to potentially more water and nutrient loss from pots.

Blending peat moss and perlite with pomace compost of either age to produce the 50% pomace medium resulted in significantly less N and water loss and less air-filled pore space. In general, with greater the air-filled pore space more water (and soluble nutrients) is likely to drain from the pot after watering and, in most cases, the sooner the plants must be watered again. The findings here suggest that adding peat moss might have created a "tighter" growing medium, more retentive of N and water than the 100% pomace treatment. Also, plants in 50% old pomace treatment grew larger than the 100% pomace treatment.

Good quality greenhouse plants can be grown in a mix consisting of only composted cranberry pomace. However, growers may find that they can save on water and irrigation operation costs and reduce N loss by mixing pomace with sphagnum peat moss at 40-50% by volume. Under the conditions of this study water loss by leaching was reduced nearly 50% by mixing composted pomace with peat moss.

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