http://ipm.osu.edu/fruit/index.html

THE OHIO STATE UNIVERSITY Newsletter Extension

Fruit ICM News

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In This Issue:

Calendar

December 12: Ohio Fruit Growers Society/Ohio Vegetable & Potato Growers Association Policy Development Meeting, noon at Dutch Heritage in Bellville

Jan. 15-17, 2003: Ohio Fruit & Vegetable Growers Congress & Ohio Roadside Marketing Conference, Toledo SeaGate Convention Centre and Radisson Hotel. Contact Jennifer Hungerford at 614-249-2424

Jan. 27-29, 2003: Indiana Horticultural Congress; Adams Mark Hotel in Indianapolis.

Feb. 7-8, 2003: North American Bramble Growers' Association will meet in Leesburg Virginia. The meeting will be held at the Holiday Inn at the Historic Carradoc Hall. Contact Jason Murray, Commercial Horticulture Agent, for further information, at jamurray@vt.edu or 703-737-8978. You can view the program at http://www.ento.vt.edu/Fruitfiles/NABGAProgram03.pdf

February 9-11, 2003: Ohio Grape-Wine Short Course at Wyndham Dublin Hotel in Dublin. For registration information and other details call 800-227-6972 or go online to http://www.ohiowines.org/

Certified Crop Advisor Program Continuing Education at the Growers Congress

Source: Tom Sachs, Ohio Fruit Growers Society

Every year education participants at the Growers Congress have the opportunity to earn Continuing Education Units (CEU) for the American Society of Agronomy's Certified Crop Advisor Program (CCA). Those needing CEU's will have the opportunity to earn them at the 2003 Congress. The CCA

program offers a self-directed education option that will be utilized at the educational sessions this year. Essentially, participants determine which educational sessions qualify for CEU's, then attend those sessions and report their attendance to CCA program administrators. CCA attendees will need to report their certification number, the competency area (Nutrient, Soil & Water, Pest or Crop Management), credit hours claimed, and detailed educational session information.

CCA attendees may submit their reports online at the American Society of Agronomy's Certified Crop Adviser Program website at http://www.agronomy.org/cca/. The website has a full explanation of the self-directed educational process. Hard copy CCA Self-Directed CEU forms will also be available at the Growers Congress. For more information, contact Michele Welsh, CCA Program, 677 S. Segoe Rd., Madison, WI 53711-1086, phone: 608-273-8090 Ext 325, fax: 608-273-2081, e-mail: mwelsh@agronomy.org.

Fruit Websites

Bulletins:

Bramble Production, Management, & Marketing - OH: http://ohioline.osu.edu/b782/index.html

Commercial Small Fruit & Grape Spray Guide, 2002 -OH: http://www.hort.purdue.edu/hort/ext/sfg/2002%20pdfs/complete.pdf

Commercial Tree Fruit Spray Guide, 2001 - Midwest: http://www.agcom.purdue.edu/AgCom/Pubs/ID/ID-168.pdf

Controlling Diseases & Insects in Home Fruit Plantings - OH: http://ohioline.osu.edu/b780/index.html

Grapes, Growing - IN: http://www.hort.purdue.edu/ext/HO-45.pdf

Fruit Spraying Calendar, 2001 - MI: http://www.msue.msu.edu/epubs/pestpubs/E154/

Midwest Small Fruit Pest Management Handbook- OH: http://ohioline.osu.edu/b861/index.html

Midwest Tree Fruit Pest Management Handbook- KY: http://www.ca.uky.edu/agc/pubs/id/id93/id93.htm

Orchard Spray Rates - OH: http://ohioline.osu.edu/b892/index.html

Plant Pest Handbook - CT: http://www.caes.state.ct.us/PlantPestHandbookFiles/pphIntroductory/pphsrch.htm

Small Scale Fruit Guide - PA: http://ssfruit.cas.psu.edu

Tree Fruit Production Guide - NJ: http://www.rce.rutgers.edu/pubs/treefruitguide/

Tree Fruit Production Guide - PA: http://tfpg.cas.psu.edu

Newsletters:

Facts for Fancy Fruit - IN: http://www.hort.purdue.edu/fff/fff.html

Fruit Crop Advisory Team Alert - MI: http://www.msue.msu.edu/ipm/fruitCAT.htm

Fruit Facts - KY: http://www.ca.uky.edu/HLA/fruifact/

Fruit Times - PA: http://frec.cas.psu.edu/fruit_times.htm

Illinois Fruit & Vegetable News: http://www.aces.uiuc.edu/~ipm/news/fvnews.html

Massachusetts Berry Notes: http://www.umass.edu/fruitadvisor/berrynotes/index.html

New York Berry News - NY: http://www.nysaes.cornell.edu/pp/extension/tfabp/newslett.shtml

Ohio Fruit ICM News: http://ipm.osu.edu/fruit/index.html

Ontario Berry Grower: http://www.gov.on.ca/OMAFRA/english/crops/hort/news/index.html#allont

Scaffolds Fruit Journal - NY: http://www.nysaes.cornell.edu/ent/scafolds/

Other:

Archived Terminal Market Reports - USDA: http://mis.ifas.ufl.edu/cgi-bin/barc/barc?a=m

Berry Crop Profiles - NC: http://pestdata.ncsu.edu/cropprofiles/cropprofiles.cfm

Harvest Maturity Indicators for Fruits - KS: http://www.oznet.ksu.edu/library/hort2/MF1175.PDF

Midwest Small Fruit & Grape Net - OH: http://fruit.osu.edu

Ohio Farmers Market Directory: http://www.ohioproud.org/graphics/Pubs/FMD.asp

Ohio Fruit Calendar: http://www.ag.ohio-state.edu/~luca/hort/images/fruit.jpg

Soil Quality in Small Fruit Production - OH: http://ohioline.osu.edu/b898/index.html

Stretch Out Your Season with Hoophouses - WI: http://bse.wisc.edu/hfhp/tipsheets_html/hoophouse.htm

USDA Quality Standards for Fresh Fruit: http://www.ams.usda.gov/standards/frutmrkt.htm

USDA Quality Standards for Processing Fruit: http://www.ams.usda.gov/standards/frutpro.htm

Biocontrol Products Available for Use Against Plant Pathogens - OH: http://www.oardc.ohio-state.edu/apsbcc/productlist.htm

Budding and Grafting - AL: http://www.aces.edu/department/extcomm/publications/anr/anr-402/anr-402.html

Cornell Fruit Fact Sheets- NY: http://www.nysipm.cornell.edu/factsheets/treefruit/index.html

Diseases of Tree Fruit - WV: http://www.caf.wvu.edu/kearneysville/wvufarm8.html

Fruit Crop Profiles - NY: http://pestdata.ncsu.edu/cropprofiles/cropprofiles.cfm

Fruitfulness & Pollination - AL: http://www.aces.edu/department/extcomm/publications/anr/anr-53/anr-53-e/anr-53-e.html

Fruit Gallery Images for Insects & Diseases -WV: http://www.caf.wvu.edu/Kearneysville/

Fruit Marketing Program - USDA: http://www.ams.usda.gov/fv

Mid-Atlantic Regional Fruit Loop - WV: http://www.caf.wvu.edu/kearneysville/fruitloop.html

Mid-Atlantic Regional Fruit Loop, Virginia Apples - VA: http://www.caf.wvu.edu/kearneysville/fruitloop.html

Ohio Farmers Market Directory: http://www.ohioproud.org/graphics/Pubs/FMD.asp

Ohio Fruit Calendar: http://www.ag.ohio-state.edu/~luca/hort/images/fruit.jpg

Ohio Fruit Growers Society: http://ohiofruit.org

Orchard Network for Apple Producers - Ontario: http://www.gov.on.ca/OMAFRA/english/crops/hort/news/index.html#Orchard

Pruning & Training Fruit Trees Slide Show - PA http://tfpg.cas.psu.edu/pruning/slide1.htm

Tree Fruit Information - NY: http://www.hort.cornell.edu/extension/commercial/fruit/treefruit.htm

Virtual Orchard - VT: http://orchard.uvm.edu

Ohio State University Department of Horticulture and Crop Science: http://www.hcs.ohio-state.edu/hcs/hcs.html

Cornell Viticulture Grape Pages - NY: http://www.nysaes.cornell.edu/hort/faculty/pool/GrapePagesIndex.html

French Hybrid Grape Budget - OH: http://aede.osu.edu/People/Moore.301/grape/index.htm

Grape Crop Profile - OH: http://pestdata.ncsu.edu/cropprofiles/docs/ohgrapes.html

Grape Crop Profiles - IN: http://pestdata.ncsu.edu/cropprofiles/docs/INgrapes.html

Grape Genetics - NY: http://www.nysaes.cornell.edu/hort/faculty/reisch/grapegen.html

Grape Growers Association - MD: http://www.marylandwine.com/mgga2/mggahome.htm

Grape (Labrusca) Crop Profile - NY: http://pestdata.ncsu.edu/cropprofiles/docs/nygrapes-labrusca.html

Grape Production Information - NY:
http://www.hort.cornell.edu/extension/commercial/fruit/grapepubs.htm

Grape Production - OR: http://berrygrape.orst.edu/fruitgrowing/grapes/grapeproduction.htm

Grape Training Systems - NY: http://www.nysaes.cornell.edu/hort/faculty/pool/train/trainandstocks.html

Grape Web - OH: http://www.oardc.ohio-state.edu/grapeweb/

Grape (Vinifera and French Hybrid) Crop Profile - NY:
http://pestdata.ncsu.edu/cropprofiles/docs/nygrapes-vineferaandfrenchhybrid.html

Grapes, Wine & Juice for Cool Climates - NY:
http://www.nysaes.cornell.edu/hort/faculty/reisch/bulletin/wine/

Low Input Viticulture & Enology Program - OR: http://berrygrape.orst.edu/LIVE/

Making Wine - PA: http://winegrape.cas.psu.edu/making_wine/index.html

Northwest Berry & Grape Information Network - OR: http://www.orst.edu/dept/infonet/

Ohio Grape Web: http://www2.oardc.ohio-state.edu/grapeweb

PennState Winegrape Network - PA: http://winegrape.cas.psu.edu/index.html

Table Grapes for Cool Climates - NY: http://www.nysaes.cornell.edu/hort/faculty/reisch/bulletin/table/

Tender Fruit Grape Vine - Ontario:
http://www.gov.on.ca/OMAFRA/english/crops/hort/news/index.html#Tender

Viticulture & Enology - CA: http://wineserver.ucdavis.edu

Winegrowers Association - NC: http://www.ncwine.org/ncwa.htm

2002 Commercial Small Fruit & Grape Spray Guide - OH:
http://www.hort.purdue.edu/hort/ext/sfg/2002%20pdfs/complete.pdf

Terminal Market Wholesale Fruit Prices November 27, 2002

The intent of listing terminal market prices is to provide information available in the public domain. It is not intended for price setting, only to assist growers in evaluating the value of their crops. Producers need to remember that the prices listed are gross, and consideration must be given to marketing costs, including commission, handling charge, gate fees, and possible lumper fees.

Source: Chicago http://www.ams.usda.gov/mnreports/HX_FV010.txt
Detroit http://www.ams.usda.gov/mnreports/DU_FV010.txt
Pittsburgh http://www.ams.usda.gov/mnreports/PS_FV010.txt

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	Chicago	Detroit	Pittsburgh
Apples, ctns trypk, U.S. ExFcy			
McIntosh Fancy Cortland	**WI** 64s, 72s, 80s 25-26 **WI** 72s 16.00		
Apples, ctns trypk, Comb U.S. ExFcy-U.S. Fancy G. Delicious Red Delicious			**WV** 125s 12.50 138s 12.50 **WV** 125s 13.00 138s 13.00
Apples, ctns celpk, U.S. ExFcy			
Empire		**NY** 100s 25-26.00 120s 20-21.00	
McIntosh	**NY** 80s 26.00	**NY** 100s 25-26.00 120s 20-21.00	
U.S. Fancy McIntosh	**NY** 80s 16.50-17.00 96s 26.00 100s 16.50-17.00		**NY** 80s 18.00-19.00 100s 18.00-19.00 120s 15.50
Apples, cartons, 12 3-lb filmbags U.S. ExFcy Golden Delicious Jonathan Red Delicious Red Rome		**MI** 2½" min 15-15.50 **MI** 2½" min 16-16.50 **MI** 2½" min 15-15.50 **MI** 2½"min 13.50-14.00	
Apples, cartons, 12 3-lb filmbags			
U.S. Fancy - Empire			**WV** 2¼" min 12.50
Fugi		**MI** 2¼" min 12.00-12.50	
Gala	**MI** 2½" up 16-16.50 2¼" min 15.00	**MI** 2¼" min 12.00-12.50	
Golden Delicious	**MI** 2½" up 15.00 **MI** 2¼" min 12.50	**MI** 2½" min 11.50-12.00 2¼" min 11.50-12.00	**WV** 2¼" min 12.50
Jonathan	**IL** 2½" min 15-16.00 **MI** 2&frac14l" min 15.00	**MI** 2¼" min 11.50-12.00	
McIntosh		**MI** 2¼" min 12.00-12.50	**NY** 2½" min 12.75-13.50
Red Delicious	**IL** 2¼" up 15-15.50 **MI** 2 ¼" min 12.50	**MI** 2½" min 12.00 - 13.50	**WV** 2¼" min 12.50

		2 ¼" min 11.50-12.00	
Apples, bu cartons, loose	No Grade Marks		No Grade, no size marks
Gala	**MI** 2½"min 16.00 2¼" min 13.00		**WV** Empire 12.50
Golden Delicious	**MI** 2¼" min 12.00	**MI** ExFcy 2¾" up 15-16.00 Fcy 2½" up 12.00	No Grade, no size marks **WV** Golden Delic. 12.50
Jonathan	**IL** 2¼" up 14.00		
Red Delicious	**MI** 2½" up 15.00 2¼" min 12.00	**MI** ExFcy 3" min 14.50-15 Fcy 2¾" up 12.00	No Grade, no size marks **WV** Red Delic.12.50

Sap-Petiole Analysis to Determine Nitrogen Applications to Eastern US Strawberry Cultivars for Plasticulture Systems

Source: Richard C. Funt, The Ohio State University Department of Horticulture and Crop Science

Introduction[(1)]

Sap-petiole analysis or quick testing are rapid diagnostic methods commonly used for nitrogen. They can be less expensive and eliminate the delay between the time a sample is collected and laboratory results are available. This can be important in high technology fertigation systems or a side dress fertilizer application in mid-season to know how much nitrogen is required. Plant nutrients do change quickly, particularly as plants grow rapidly.

Sap tests measure nutrient concentrations in plant sap squeezed from leaf petiole. Horibe/Cardy meters are handheld, battery-operated meters, and are the most popular type of sap testing equipment in use today. They require a small volume of sample and give a direct readout of concentration. Sufficiency levels for several vegetable crops have been developed in Florida, California, and Ohio. Our climate and soils may require different nutrient management methods to reach the same levels.

Research/Extension recommendations for nitrogen fertilizer in strawberry can best be determined by leaf analysis when leaf samples are taken from the largest mature leaf from healthy non-diseased plants. Nitrogen tends to be at higher concentrations in the spring and lower in summer. When leaf samples are submitted from mature plants between July 15 to August 15, they should contain 2.0 to 2.8% nitrogen. If samples are below 1.8% nitrogen, fertilizer should be increased by 10% of each 0.1% that the sample is below the desired level. If above 2.8%, the rate should be reduced by 10% for each 0.1% that the sample exceeds the desired level (Funt et al. 1997).

Methods

Two experiments were established in newly planted strawberry plasticulture systems. In the first experiment Avalon strawberry plug plants were planted in a single row at 12 inches apart in early September 2001 on raised beds and microirrigation near Darby Dale about 10 miles south of Columbus,

Ohio. In the second experiment, Allstar strawberry plug plants were planted in a double staggered row 12 inches between plants and 12 inches between rows in early August 2001 near Bellville, about 50 miles north of Columbus, Ohio. In each experiment there were three treatments: 1) control - no plastic, 2) black (embossed) plastic, 3) white plastic. One soil sample was taken from each treatment at planting of each experiment and sent to the Agricultural Analytical Services Laboratory at Penn State University for all soil elements and percent nitrogen analysis. Each experiment had guard rows planted to different strawberry cultivars in a plasticulture system, and three replications in a randomized complete black design. All plants were from Davon Crest Farms, Hurlock, MD. A general description and timing of cultural practices for both experiments are shown in Table 1.

Sap-petiole samples were collected after bloom at first harvest, before renovation and before flower bud formation. All samples were collected from mature leaves at mid day (10:00 AM to 2:00 PM), placed in a paper bag and kept cool. Petioles were removed, squeezed by a handheld garlic press, and sap was placed on a calibrated Cardy meter. Completion of the petiole data generally occurred within 1 to 3 hours after collection, under cover (shade), and leaves were placed into an oven at 128^0 F for drying for 48 hours. Leaves were sent to the Penn State Agricultural Analytical Service Laboratory (University Park, PA) for nitrogen content derived from a combustion process. Statistical analyses were performed with SAS procedures and software (SAS, 1990). A correlation analysis was completed to test whether sap testing for nitrogen compared to leaf nitrogen levels.

Results

Soil test results for both experiments for pH, phosphorus, potassium, and magnesium showed optimum to above optimum levels for all experimental treatments (data not shown). Soil organic matter ranged from 2.2 to 2.4%, CEC ranged from 11.1 to 11.7 (data not shown).

pH ranged from 7.2 to 7.4, calcium ranged from 1529 to 1653 ppm for all treatments, and extractable zinc and copper were considered to be low (data not shown). Soil nitrogen ranged from 0.13 to 0.14%.

In the Avalon cultivar, sap-petiole sample readings dropped from pre-bloom to before harvest and held steady to after harvest (Table 1). During the same time leaf nitrogen samples dropped and continued to drop to after harvest and remained steady before bud formation. Leaf nitrogen samples for Allstar dropped from prebloom and declined steadily until just before bud formation. The only sample time where leaf nitrogen dropped below the 1.8% level was in treatment one, before bud formation in Allstar. However, the sap-petiole levels for Allstar started low, increased rapidly, and reached a peak before bud formation.

For Avalon, fertigation started after harvest with several applications of 20-20-20 plus micronutrient fertilizer. For Allstar, three foliar applications of 20-20-20 commenced after bloom but before the harvest sample. Another two foliar applications occurred before bud formation.

Over the entire season, the average leaf nitrogen was between the acceptable range of 1.8 to 2.8% (Table 1). In general, both Avalon and Allstar had averages at the high end of the leaf nitrogen levels.

Discussion

The Avalon strawberry cultivar was produced at a site 10 miles south of Columbus, while the Allstar cultivar was grown about 50 miles north of Columbus. Soil tests from each location were remarkedly the same in pH, CEC, percent organic matter, and elements. Nitrogen applications occurred at different times and methods of application.

The Cardy meter, sap-petiole readings responded very well to either foliar or fertigation applications. However, when sap-petiole readings are compared to leaf nitrogen results, there appears to be little correlation to each other (one goes up the other goes down).

In previous research with Scott and Redchief cultivars, there were no differences between full rates of granular soil applied nitrogen as compared to 1/4, 1/2, or full rate of nitrogen injected to trickle irrigation systems (Goulart and Funt, 1985).

It is normal for leaf nitrogen results to begin at high levels and go down over the season and be the lowest before September. This appears not to be the same for petioles. When nitrogen in liquid form is either applied to the soil or leaf, the petiole nitrogen levels increase, but leaf nitrogen levels generally remain the same or decrease.

Research/extension programs indicate that 1.8 to 2.8% leaf nitrogen. Based on this experience, a standard should be established with petioles as in grapes rather than leaves. Thus comparing sap-petiole field meter readings to petiole nitrogen results from a laboratory may be a more reliable method to establish new standard meter ranges.

Conclusions

There was little correlation between sap-petiole meter readings as compared to standard leaf nitrogen laboratory results. This was the first trial on two cultivars, and a second year testing petiole samples and leaf samples should be completed to find a better standard for making nitrogen recommendations for eastern strawberry growers.

References:

Bierman, P.M., T.A. Wall, and L. Fuhrmann. 1999. Fertigation and Petiole-Sap Testing. Proc. Ohio Fruit and Vegetable Grower Congress. pp 62-64.

Funt, R.C., M.A. Ellis, and C. Welty. 1997. Midwest small fruit pest management handbook. Ohio State University Extension Bulletin 861. pp 167-168.

Goulart, B.L. and R.C. Funt. 1985. The influence of raised bed systems on strawberry growth and yield. Advances in Strawberry Production. Vol. 4 pp 15-19.

SAS Institute, Inc. 1990. SAS/STAT user=s guide. 4th ed. Vol. 2. SAS Inst., Cary, NC

Table 1. Comparison of sap-petiole and leaf nitrogen content for Avon and Allstar strawberry cultivars, OH-2002

Treatment[1]	Avalon - Nitrogen		Allstar - Nitrogen	
	Petiole[2]	Leaf[3]	Petiole	Leaf
Prebloom		%		%
1	507	3.2	73.3	3.0
2	407	3.4	36.7	3.4
3	430	3.5	70.0	3.5
Before Harvest				

1	200	3.0	1433 b	2.4
2	287	3.2	1533 b	2.4
3	193	3.3	2700 a	2.6
After Harvest				
1	227	2.2	1233	2.0
2	293	2.2	1700	2.2
3	280	2.3	2400	2.3
Before Bud Formation				
1	3167	2.4	2800	1.6
2	2500	2.3	4500	1.9
3	2833	2.2	4567	1.8
Average for the Season				
1	1025	2.71	1285 a	2.23 b
2	872	2.79	1959 ab	2.54 a
3	934	2.83	2419 a	2.57 a

[1] Treatments are control (no plastic), black plastic, and white plastic for Avalon and Allstar. All treatments on irrigated raised beds.

[2] Petiole readings from Cardy meter within 4 hours of sampling

[3] Leaf nitrogen percent from Penn State Analytical Lab

Table 2. Description of two plasticulture systems using plug plants of eastern strawberry cultivars, OH 2001-2002

Cultural Practice	Ohio Growers	
	Darby Dale	Bellville
July-December, 2001		
Fumigation	Methyl Bromide	None
Chicken Litter	None	10 to 12 tons/acre (2 years old)
Nitrogen Applied	50 to 60 gal 28% (150 lbs N/A)	None
Phosphorus, Potassium	50 lbs actual for each	None
Soil nitrogen samples taken	Yes	Yes
Beds, Plastic, etc.	Yes	Yes
Plants arrived	August 1	August 1
Plants hardened off	30 days	7 days
Single, Double rows	Single	Double (staggered)
Plants Lost	8%	0%
Planting Type - hand	Burn hole plus water wheel	Water wheel
Sod between rows	No	Yes
Hand-planted Date	September 5	August 8
Rainfall	August 22 to 31 (3.0 inches)	August 12

Cold Tremperature - October 9	33F	31F (near record)
Deer feeding - October 30	No	Yes
Straw applies - December	Yes	Yes
April - October, 2002		
Straw removal	April 1	May 3
Fungicide Applications	2	4
Herbicide Applications (no plastic)	2	3
Gramoxone (Paraquat) at renovation	Yes	Yes
Hand weeding (no plastic)	1	3
Foliar Feeding # applications	No	5 (May 3 to August 22)
Fertigation - # applications	3 (August and September)	No
Addition of Zinc to soil	Yes, 17 lbs/A (28%)	No
Rows narrowed	Yes, chemical herbicide	Yes, chemical herbicide

1. [1] Appreciation is extended to the Ohio Small Fruit and Vegetable Research and Development Fund and to the Ohio Fruit Growers Society for financial support of this research.

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