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

THE OHIO STATE UNIVERSITY Newsletter Extension

Fruit ICM News

Volume 6, No. 10
April 18, 2002

In This Issue:

Calendar

April 27: High Tunnel Workshop at the Penn State High Tunnel Research and Education Facility, Rock Springs, PA

May 23: Plasticulture Strawberry Field Night, Southern State Community College, U.S. Rte. 62 North, Hillsboro, Ohio. Program includes winter protection trial, date of planting study, cultivar trials, bed shaper study, specialty equipment, overhead irrigation, trickle irrigation. For more information contact Brad Bergefurd at 740-289-3727 or bergefurd.1@osu.edu.

July 10: Ohio Fruit Growers Society Summer Tour, Hirsch Fruit Farm, Chillicothe, OH. For information about the Ross County/Chillicothe area check out http://www.visithistory.com. For more info about the summer tour, call Tom Sachs at 614-249-2424.

Brambles - Plant Cold Injury, Soils, Minerals, and Pruning

Source: Richard C. Funt, OSU Dept. of Horticulture and Crop Sciences

Brambles, raspberries and blackberries, are susceptible to plant injury or death when planted, fertilized, or pruned improperly. Improper planting or cultural practices can cause plant injury and lower yields. Climate (temperature and rainfall) has a lot to do with plant injury, particularly in fall and late winter. Red raspberries survive colder winter temperatures than blackberries. Cultivars differ in surviving cold temperatures.

Poorly drained (internally) soils or wet soils are detrimental to high yields. Roots grow poorly and do not reproduce sufficiently for maximum leaf surface. Plants may not produce sufficient carbohydrates for resistance to cold temperatures. Brambles should not be planted in soils which are saturated in the upper 12 to 18 inches for long periods of time. Raised beds are recommended for the medium to heavy textured soils in Ohio. Organic matter, incorporated into the top four inches of the raised bed, can improve internal soil drainage.

The pH of the soil should not be above 6.5 to 6.7. A high pH can reduce the uptake of zinc. A pH of 5.8 to 6.2 is recommended. Soils with a good pH may be low in zinc. Low zinc reduces plant vigor and resistance to cold temperatures. Generally, soils should contain 5 to 8 pounds of actual zinc per acre.

High soil levels of nitrogen and potassium can cause vigorous growth, cause plants to have a reduced level of acclimation and predispose plants to cold injury. Heavy applications of manure and/or fertilizer and lime can all affect raspberry cold injury. It is recommended that fresh organic matter be added to the soil prior to planting and that soil tests should read 3 to 4% organic matter after planting. The amount of annual nitrogen fertilizer needs to be reduced when soil test results show 3 to 4% organic matter. Leaf (tissue) samples can be the best method to determine fertilizer application after raspberries are planted.

Removal of the floricanes (fruiting canes) before Christmas can increase the chances of cold injury. Old canes provide carbohydrates to the crown of the plant that will be used by the new plants. In a critical cold injury situation, removing old canes in March before new growth starts is the best cultural practice.

Proper soil selection, soil water management, soil fertility, and cultural practices are necessary for brambles. For more information refer to OSU Extension Bulletin 782 - Brambles and to OSU Extension Bulletin 861 for soil and leaf (tissue) elemental content recommendations.

Ohio Strawberry Plasticulture Advisory Newsletter, Vol.1 No.2

Source: Brad Bergefurd, Editor & Extension Agent, Horticulture, Ohio State University South Centers

About this newsletter:

Having received many good comments and feedback from our last newsletter, we will try to make this a regular advisory, sent out at least weekly. We are currently putting it on our website, where you can download the advisory with pictures attached. These will also be archived on the web, making them good tools as we learn from our experiences and mistakes.

We will provide the address when we get it. Stay tuned! If you would like to receive the newsletter, e-mail me your e-mail address for now, and we will get you added to the list. Eventually we hope you will be able to subscribe to this as a list serve.

The key to making this newsletter useful is for you to provide feedback, past experiences, and what you

are currently experiencing in terms of Plasticulture strawberry problems, concerns, and successes. This is how we will learn to make Plasticulture strawberry production successful here in Ohio. Good Luck!

Fertilizer Injection program:

Boy! What a little sunshine and heat will do for Plasticulture strawberries! Our plantings in Hillsboro and Piketon have really jumped this week. We began to inject greenhouse grade calcium nitrate to our plots this week. We are injecting at the rate of 7 pounds of actual N per acre through our trickle irrigation systems. We are using Dosatron fertilizer injectors at both locations. Whatever water-soluble fertilizer you are using, the fertilizer always seems to go into concentration better if you use warm water to mix your concentrate. The concentrate must be dissolved well to prevent plugging up injectors, filters, and lines.

We delivered our strawberry plant leaf blade samples for analysis to the lab last Friday and are hoping to get our results by e-mailed today. We collected the most recent mature trifoliate (leaf) and petiole for testing. Avoid collecting small and underdeveloped leaves, which are slick-looking with a light green color, as they will not give accurate readings. Also avoid collecting old dull-looking leaves. I would have liked to see where we were on our ppm N in the plant before we began our fertilizer injection, but the way things took off growing this week, we decided to begin injecting without our results.

We will now begin weekly monitoring of our plant nitrate levels by collecting leaf petioles from throughout the field and pressing the leaf petioles using a hand held garlic press. Using a Cardy Nitrate Meter we will then take these "quick" tests out in the field. These weekly readings will tell us if we need to adjust our weekly feeding program.

Clean up, fungicide applications, disease prevention:

If you have not cleaned your fields of dead leaves, and winter and summer annuals are even starting to grow through plastic holes, it is still not too late to perform this task. With the new growth the plants have put on in the last 10 days, it may take a little longer to perform the clean up, but I think it would be well worth your time. Removing the dead leaves and frozen blossoms may reduce potential botrytis infections this spring. We will begin making our first application of Quadris fungicide (to start our Anthracnose prevention program) at both Piketon and Hillsboro sites today (if the rains hold off, we will have performed our clean up last week). We will be applying Benlate (we have some stock we need to use up this year) next week to begin our Botrytis control program.

According to Dr. Barclay Poling, NC State, North Carolina is experiencing areas of severe anthracnose outbreaks. (See his recent advisory at http://intra.ces.ncsu.edu/depts/hort/berrydoc/april11/index.htm).

Could this type of outbreak hit Ohio this year? According to Plasticulture strawberry growers who harvested Chandler variety last year in Ohio and Kentucky, depending on the area, Anthracnose took its toll on them last year. This early Quadris application to our crop may reduce an outbreak of anthracnose in our variety susceptible plantings, but this is entirely dependant upon our spring weather conditions. Remember to rotate fungicide to prevent resistance buildup.

Fungicide labels and information:

Access to fungicide labels is important for crop and human safety. Here are web site addresses, compiled by Dr. Barclay Poling in his March 15th *Berry Agent Advisory* that will make it easy to get the most recent information.

Quadris Label:

go to http://www.syngentacropprotection-us.com/labels/Index.asp?nav=SpPrdLst

2. enter your state

enter and select

4. click on the small arrow - takes you to state label (in Acrobat)

Web links to fungicides:

Captan: http://strawberry.ifas.ufl.edu/captan.pdf

Thiram: http://strawberry.ifas.ufl.edu/thiram.pdf

Elevate®:http://www.tomenagro.com/Default_US.htm

Switch®: http://strawberry.ifas.ufl.edu/switch.htm

Plasticulture Strawberry Field Night:
Program for Thursday, May 23, at 6:00 p.m.:

- Winter protection trial for Plasticulture strawberries
- Date of planting study for Plasticulture strawberries
- Eastern and western Plasticulture strawberry cultivar trial
- Comparison study of two different bed shapers used for Plasticulture strawberry production
- View specialty equipment, overhead irrigation, and trickle irrigation used for Plasticulture strawberry production.

Location is Southern State Community College, U.S. Rte. 62 North, Hillsboro, Ohio. Admission is free. Light refreshments are provided. For more information, contact Brad Bergefurd at 740-289-3727 or bergefurd.1@osu.edu or Thom Harker at 740-289-3727 or harker.7@osu.edu.

Grape Weed Management

Source: Tony Wolf, Virginia Tech, VA Viticulture Notes, March-April Issue, April 5, 2002

Surflan (oryzalin) is a pre-emergent herbicide registered for use in both young (including first year) and bearing vineyards. Prowl would be a good alternative to Surflan in nonbearing vineyards. Chemically, Prowl is very similar to Surflan and will provide similar control. Prowl, like Surflan, works best on annual grass and small seeded broadleaf weeds. The manufacturer has never registered Prowl for use on bearing vineyards. Prowl should be applied as a directed spray to dormant grape vines. Prowl can stunt growth and cause abnormal leaves to form if sprayed over the top of plants after budbreak. Another substitute for Surflan would be Solicam, but only if the vines have been in the ground for 2 seasons. Watch the rate of application on sandy soils. Vines growing in heavier soils can tolerate higher rates of Solicam. The injury symptom from Solicam is bleaching of foliage, which is more likely to occur in

sandy soils. Plants will outgrow any bleaching that occurs. Solicam works well in combination with Princep. Solicam controls annual grasses and certain annual broadleaf weeds, and will suppress nutsedge. Combining it with Princep will provide better broadleaf control.

Herbicide Update for Small Fruit

Source: Dr. A. Richard Bonanno, University of Massachusetts Amherst

Select 2E (clethodim)

This is a postemergence grass herbicide, which is similar in activity to Poast (sethoxydim). Growers should see improved activity on cool season grasses such as annual bluegrass and on perennial grasses as well. Registered crops include potato, tomato, pepper, eggplant, celery, carrot, radish, summer squash, winter squash, pumpkin, cucumber, melon, watermelon, and strawberry. The label contains pre-harvest intervals for all registered crops. A crop oil concentrate at a rate of one quart per 100 gallons spray mix must be used. Do not spray on hot and humid days, as crop injury can result. See label for other precautions.

2,4-D Formulation Change

Amine 4 is the new formulation of 2,4-D amine (salt) available for use in asparagus, sweet corn, and strawberry. Formula 40 will no longer be available. There are many ester and low-volatile ester formulations on the market for other uses of 2,4-D. Be certain to NEVER use ester or low-volatile ester formulation of 2,4-D on vegetable or fruit crops. Both ester and low-volatile ester formulations of 2,4-D can move from the target area after application during warm weather or low humidity. They have the potential to damage crops far from the site of application and their movement is unpredictable.

Gramoxone (Paraquat) Formulation Change

Gramoxone Max 3S is the new formulation replacing Gramoxone Extra for all uses. Label rates are generally lower than the old formulation since Gramoxone Max contains more active ingredient per gallon. As with the old formulation, the use of a nonionic surfactant is still required. With Gramoxone, always remember that better weed coverage through the use of more water per acre will result in better weed kill.

Dacthal 75WP (DCPA) Is Available

Dacthal herbicide is back on the market with all the previous labeling. The price of this product has more than doubled, however, rising to approximately $14 per pound. Critical uses of this product are on newly transplanted strawberry and on direct-seeded onions.

***Note**: These articles are based on our best available knowledge at the time of publication. No endorsement is implied by inclusion, nor is lack of endorsement from non-inclusion. Always read and follow the label before using a pesticide; if the label disagrees with the above information, follow the label.*

Eye on the Sky

Source: Bill Turechek, Plant Pathology, Geneva, Scaffolds Fruit Journal, Volume 11, No. 5, April 15, 2002

Weather plays a critical role in the daily activities of a grower. Orchard care, fertilization, and, perhaps most critically, pest management are all governed by weather. Most growers do not rely on regular calendar applications to manage pests, but try to time important fungicide and insecticide applications based on the weather. In fact, growers who rely on disease forecasting models to time applications know that nearly every model or predictor that forecasts plant disease requires reliable weather information. For example, the *MARTBLYT* model used to predict blossom blight infection of fire blight of apple and pear requires readings of the daily high and low temperature and measurements of precipitation in the form of rainfall or dew. The *Venturia inaequalis* (apple scab) ascospore maturity model requires daily readings of temperature.

So how does a grower collect reliable weather data? Weather data can be collected in two basic ways: from on-farm instrumentation or from offsite instrumentation. The benefit of using onsite weather equipment is that instruments can be placed at locations that historically have higher levels of disease pressure and will enable you to closely monitor conditions. Weather data collected from offsite instrumentation can be very representative of your farm if the instrumentation is located nearby. Offsite data can be delivered via telephone, fax, telemetrically, and via the internet and can be done so at a frequency as little as once per day to being available nearly instantaneously.

Nonetheless, depending upon the quality of the instrumentation and the weather variables measured, measurements made on farm are unquestionably the most representative of your farm.

Yet, in the grand scheme of pest management the question arises: How accurate does weather data need to be? Do you need to record temperature to an accuracy of 1 degree? Does it make a difference if 1 inch of rain fell versus 1.25 inches? For plant diseases the answer is "it depends." It depends upon the disease (s) of concern and the models that you are running. Therefore, every grower must make the decision on how valuable precise weather data is to them.

Onsite instruments

The basics to weather monitoring begin with measurement of temperature, usually the day's high and low are of greatest importance, atmospheric and free moisture (e.g., relative humidity and rain), and leaf wetness. There are many makes and models of instruments capable of recording these variables, and some of these will be discussed in what follows.

Temperature is the environmental variable that is often most correlated with a biological response and is nearly universally included in forecasting models. Several types of thermometers are available to measure temperature. Liquid-in-glass thermometers are the most widely used. Most thermometers now use alcohol (rather than mercury) as a medium and are calibrated to a precision of around 0.5C. Thermometers should be placed strategically throughout the farm, particularly in low-lying areas where frost is a danger, as those few degrees of variability at lower temperature can be quite critical. Thermometers, particularly high-low thermometers, must be read daily in order to retrieve the data, which can be a cumbersome chore. Otherwise, errors with this type of thermometer are often associated with poor readability, radiation, or through parallax (i.e., not reading the thermometer on a line parallel to the top of the liquid column). Deformation thermometers include the bimetallic strip and Bourdon tube thermometers. The bimetallic strip thermometer measures the linear deflection between the bond of two metals with different thermal coefficients that is caused by a change in temperature. The deflection

is recorded mechanically to a strip chart recorder (e.g., hygrothermograph). Similar thermometers are available that measure the deformation of a gas or liquid. These thermometers are similar in accuracy to liquid-in-glass thermometers, but have a slow response time and are also sensitive to solar radiation. These thermometers are most useful in controlled environmental studies where a record of the temperature is needed.

Thermocouples and thermistors are electric thermometers that are well suited to automatic recording and logging data for computer usage. Thermocouples are junctions of dissimilar metals that generate an electromotive force proportional to their temperature at the junction (Campbell and Madden, 1990). Thermistors are semiconductors of ceramic materials made by sintering (i.e., heating until a substance becomes a solid without melting) mixtures of metal oxides (e.g., manganese, nickel, cobalt, iron, copper, and uranium). The electrical resistance of a thermistor is inversely proportional to temperature. Thermistors and thermocouples can record temperature to an accuracy of 0.1C but to ensure accurate readings; electric thermometers should be aspirated, shielded from sunlight, and protected from wetness. Different types of shields are available for the different types of thermometers.

Atmospheric and free moisture are key variables in the infection process of many fungi and bacteria. Relative humidity, leaf wetness, rain, and soil moisture are the variables typically measured to quantify the level of moisture in the environment. Relative humidity (RH) is the ratio of the amount of water vapor in the air (i.e., vapor pressure) to the amount of water vapor that the air could contain at that temperature (i.e., saturation vapor pressure). Psychrometers (e.g., the sling psychrometer) measure the difference between the air temperature and the temperature recorded by a wet-bulb thermometer (a measurement of evaporative cooling) to provide a measure of the relative humidity. To obtain accurate measurements of RH with a psychrometer, thermometers capable of recording to an accuracy of 0.1C should be used. Electrical sensors that operate by measuring the change in resistance of water adsorbed to some material are used more commonly to measure RH. Electric sensors take several minutes to accurately respond to a change in RH, but this is typically not a problem in most agricultural settings.

Leaf wetness is a key variable driving foliar plant disease epidemics. Leaves may become wet from dew, fog, guttation water, irrigation water, fungicide, insecticide and fertilizer applications, and, of course, due to rain. Leaf wetness continues to be one of the most difficult parameters to measure, because it is itself so variable within the plant canopy. Three general approaches are used in measuring leaf wetness. The deWit leaf wetness sensor mechanically measures leaf wetness by measuring the contraction and expansion of a hemp string or some other element as it responds to wetting and drying. Electric sensors are the most popular. Electric sensors consist of at least two electrodes (e.g., strips of nickel, wire, etc.) that are mounted in parallel on artificial leaves made from circuit board, plastic, cloth, or other type of synthetic material designed (to some degree) to mimic surface characteristics of a leaf. The circuit is completed upon wetting, and the extent of wetting is measured by electrical resistance. However, leaf wetness sensors fall short in capturing the biological and micro-environmental variability found within a canopy, thus careful interpretation of the data reported by leaf wetness sensors must be exercised. Leaf wetness can also be estimated, but this is not widely used. For example, the number of hours above 90% RH has been used to derive an estimate of leaf wetness.

Rain not only contributes directly to leaf wetness, but serves as a major means of disseminating fungal propagules. Indeed, some of our most serious diseases are almost exclusively splash-dispersed, and the degree of dispersion is directly related to the amount, duration, and intensity of the rainfall. Rainfall can be easily and accurately measured with a number of different types of rain gauges. Rain gauges, however, must be visited shortly after the rain event and provide only a measurement of the quantity of rain that has fallen. Tipping-bucket rain gauges are used in electronic setups and provide measurements of rainfall amount, usually to an accuracy of 0.01 inch, as well as the duration of the rain.

Soil moisture is important in studies of root diseases. Soil moisture is probably the most neglected measurement of moisture because it is difficult to quantify accurately. Electric sensors are available for the quantification of soil moisture.

A number of electronic sensors are available that are capable of recording and logging virtually every weather parameter including temperature, relative humidity, rainfall, leaf wetness, light intensity, and soil temperature. These products range in their complexity as well as in their price. In short, recording devices are typically very accurate and can record at intervals as short once per every half-second to once every few hours. At longer recording intervals, some of these sensors can go on recording for years before running out of space! Most sensors, however, require you to download the information, usually into a portable "shuttle", and then transfer the information from the shuttle to your computer. This is not difficult; however, if you want to collect information daily, this can even be even more cumbersome than using simple instruments, especially if temperature is the only parameter that you are interested in. But if you do not need to collect information every day and/or more than one weather parameter is utilized and/or you are using your weather data to run various computer-driven disease or insect models, then using electronic sensors may be your best choice.

Weather equipment can purchased from a number of companies, including

A.M. Leonard, Inc. http://www.amleonard.com/main.html

Forestry Suppliers, Inc. http://www.forestry-suppliers.com/

Orchard Supply Company http://www.Orchardsupply.com

Gempler's http://www.Gemplers.com

Onset Computer Corporation http://www.onsetcomp.com , producers of the Hobo series of data loggers, and Spectrum Technologies http://www.specmeters.com, producers of the Watchdog series of data loggers, offer a wide range of affordable sensors and sensor technology. Although not a realistic option for most growers, portable weather stations are available that can transmit weather data from the field to your computer via modem. These telemetric weather stations usually consist of a combination of the electronic sensors, like those discussed above, but are wired in such a way to deliver the data directly to your computer. Maintenance of the station becomes a chore and setting up the station can be complicated.

Web-based services

Detailed weather information can be obtained via the internet. There are a number of commercial and non-commercial sites that are set up to provide free weather information for virtually every town in the United States. Of course, weather stations are not deployed in every town across the United States. Rather, sophisticated algorithms are used to predict weather across a region from base weather stations (usually located at major airports). The algorithms are becoming remarkably more accurate and can provide quite precise information to a number of areas. Some of the most popular and informative weather resources on the web include:

The United States Weather Pages http://www.uswx.com/us/wx/

Intellicast http://www.intellicast.com

The National Weather Service http://www.nws.noaa.gov/

The Weather Underground http://www.wunderground.com/

Becoming more popular are sites specifically designed to serve agriculture. Usually for a fee, these sites will provide current weather information, but more useful, they run a number of plant disease and insect forecasting models and provide recommendations based on their output. Some of these sites are set up to deliver personalized data to your email each morning and some provide colorful maps that detail pest pressure that can be viewed over the internet. Two of these companies that serve NY are the Northeast Weather Association (NEWA) and Skybit. NEWA http://www.nysipm.cornell.edu/newa/index.html is a consortium of growers who have installed small weather stations on their land. Each day, information such as the temperature, relative humidity, leaf wetness and precipitation is transmitted from the farm to the Agricultural Experiment Station in Geneva. There, the raw data is processed by several computer programs, each designed to evaluate the data and issue a pest forecast specific to the area where the fruit or vegetable grows. A grower can either choose to find the daily information from a personal computer or opt to have a forecast sent via facsimile.

SkyBit, Inc. http://www.skybit.com is a ten-year-old company specializing in development of site-specific weather products for agriculture, energy, and other industries. SkyBit, through its E-Weather Service and research programs, can provide custom data sets for weather-dependent decisions. E-Weather Service "Ag-Weather" has been supporting the agricultural community weather information needs for more than 6 years. A variety of products have evolved over the years to assist decision making in the field. These products include integrated pest management (IPM) simulation and forecast, irrigation schedules, frost predictions for select crops, as well as custom data for other commodities.

The New York Berry News

The New York Berry News premiered on March 18, 2002 as an online newsletter. As editor, Dr. Bill Turechek intends to "provide pertinent or new information, as developed from Cornell's researchers and Extension personnel, on a timely basis."

Topics in issue No. 1 included:

- Pesticide News
- What to Look for in Your Plantings
- Foliar Diseases of Strawberry
- Bird Management in Small Fruit
- Water Management in Strawberries
- Nutritional Management

Topics in issue No. 2 included:

- Small Fruit Diseases
- Frost Protection in Strawberries
- Gray Mold
- Angular Leaf Spot
- Mummyberry in Blueberries
- Phytophhora Root Rot of Raspberries
- Weather

Check out these topics and more at http://www.nysaes.cornell.edu/pp/extension/tfabp/newslett.shtml

Pest Phenology

Coming Events	Degree Day Accum. Base 50F
Redbanded leaf roller 1st catch	5 - 251
Spotted tentiform leafminer 1st catch	17 - 251
Tarnished plant bug active	34 - 299
Oriental fruit moth - 1st adult catch	44 - 338
Rosy apple aphid nymphs present	45 - 148
Green apple aphids present	54 - 156
Redbanded leafroller 1st flight peak	65 - 221
Spotted tentiform leafminer 1st flight peak	65 - 275
Apple grain aphid present	67 - 251
European red mite egg hatch	74 - 208

Thanks to *Scaffolds Fruit Journal* (Art Agnello)

Trap Report

Site: Waterman Lab, Columbus
Dr. Celeste Welty, OSU Extension Entomologist

Apple: 4/10 to 4/17/02
Pink bud stage on April 17, 2002

Redbanded leafroller: 57 (up from 5)
Spotted tentiform leafminer: 72 (up from 9)

Peach:
Bloom on April 17, 2002

Oriental fruit moth: 0 (same as last week)

Site: North Central Ohio: April 17, 2002
Apples are one-half inch green.
Peaches are in full bloom.

Degree Day Accumulations for Ohio Sites April 17, 2002

Location	Degree Day Accumulations Base 50F	
	Actual	Normal
Akron-Canton	130	91
Cincinnati	199	179
Cleveland	121	86
Columbus	192	124
Dayton	162	126
Kingsville Grape Branch	108	58
Mansfield	120	89
Piketon	208	196
Toledo	127	72
Wooster	147	79
Youngstown	133	78

SkyBit® Apple Scab Prediction for North-Central Ohio

Observed:
April 8, 9, 12-15 - possible infection & damage
April 10, 11, 16, 17 - active, but no infection

Predictions based on weather forecasts:
April 18, 23 - active but no infection
April 19-22, 24-27 - possible infection & damage

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is intended and no endorsement by Ohio State University Extension is implied. Although every attempt is made to produce information that is complete, timely, and accurate, the pesticide user bears responsibility of consulting the pesticide label and adhering to those directions.

Keith L. Smith, Associate Vice President for Ag. Adm. and Director, OSU Extension.

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