

FACTS FOR

Fancy Fruit



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Crop Conditions

Harvest of early peaches in southern areas has started with crops and fruit quality looking excellent. Redhaven harvest is still at least a week away, which is about 10 days behind normal. Grapes and berry crops are looking great. Raspberry and blueberry harvest are underway. More than adequate rain has increased vegetative growth, including both crops and weeds. It is important to stay on top of weed management as we near harvest in grapes.

Apple and Peach nutrition

While soil nutrient analysis is very useful prior to planting a new orchard, for an established orchard periodic foliar sampling is recommended. The results of foliar analysis shows what the tree has extracted from the soil rather than just what is in the soil. Sampling problem blocks may help shed light on causes of the problem and on other blocks regular sampling may help reveal trends that can help avoid future problems.

The best time to collect leaves for analysis is typically mid-July through mid-August. This is typically when extension growth has pretty much stopped and nutrient levels in the leaves have stabilized. As with any kind of nutritional analyses, obtaining meaningful results all hinges on taking a representative sample. Select one variety per sample – mixing leaves from different varieties will not give representative results of any variety. Samples should consist of 50-100 leaves, taken from the midpoint of current extension shoots around the periphery of trees. Collect 5-10 leaves per tree and take care not to

sample spur leaves or those growing in the shade. Leaves should be collected with the petiole (leaf stalk) attached.

Washing leaves to remove dust or spray residue can cause as many problems as it solves, so growers should not wash leaves, but should wait as long as possible after applying pesticides before collecting samples. A list of certified labs that can analyze samples is given at: <http://www.agry.purdue.edu/ext/soiltest.html> (Hirst)

Azoxystrobin Phytotoxicity

Several years ago, apple growers were warned to be prepared, that in the event of soybean rust, collateral damage to apples could be a real possibility due to drift from azoxystrobin, the active ingredient in the fungicide Quadris®. Soybean rust hasn't yet become the problem, but the combination of record corn and soybean prices, corn-on-corn rotations, and the promotion of azoxystrobin for improved "plant health benefits" means that the risk of collateral damage to apples has re-emerged.

In addition to Quadris®, azoxystrobin is sold for use in other crops under the trade names Abound® and Heritage®. Azoxystrobin is registered on grapes, several tree nuts, stone fruit, cucurbits and other horticultural crops, but not on apples. The fungicide is phytotoxic to a number of apple varieties, including McIntosh (Table 1). If susceptible apple trees are exposed to the fungicide – by drift or through contaminated spray equipment -- leaves and twigs could die and fruit may drop. In fact, both the Quadris and Quilt labels state that "Even trace amounts can



cause unacceptable phytotoxicity to certain apple and crabapple varieties.

There are two overarching factors that influence azoxystrobin phytotoxicity in apples: timing of application, and genetics. Earlier season applications resulted in more severe damage than later season applications. There is also a very clear and strong relationship between phytotoxicity and apple tree parentage. Symptoms of phytotoxicity on McIntosh, and McIntosh-derived cultivars (i.e., Jonamac) include a leaf spotting that is virtually indistinguishable from frog-eye leaf spot. However, not all cultivars with McIntosh parentage were found to show symptoms: Empire which also has McIntosh in its parentage did not show any phytotoxic damage. Higher concentrations (as may result from residues left in a sprayer when switching from one crop to another) will cause extensive necrosis of leaf tissue Fig. 1.



Figure 1 (Photo by Dave Rosenberger)

and browning or russetting of the skin on apple fruit Fig. 2. Azoxystrobin is labeled for a variety of crops, raising the probability that apple growers will experience occasional problems due to drift of azoxystrobin. Unlike frog-eye leaf spot, azoxystrobin injury appears suddenly and will be uniformly distributed throughout the canopy. Furthermore, injury is fairly cultivar specific (Table 1).

More recent work by Crassweller and Smith (2003) found that Suncrisp, Spigold, Gala, Hampshire, Zestar!, and Silken are also susceptible to azoxystrobin-induced phytotoxicity. Braeburn, GoldRush, Jonamac, and rootstocks CG.179 and EMLA.26 were damaged in this study, as well. Damage to Braeburn and GoldRush appeared as purple discoloration along the leaf veins. Jonamac treated leaves exhibited scorching on the leaf



Figure 2 (Photo by Dave Rosenberger)

margins as well as purple spots. Upon exposure to azoxystrobin, the rootstocks CG.179 and EMLA.26 developed leaves that curled inward, looking similar to aphid

Table 1. Apple varieties known to develop phytotoxic reactions to azoxystrobin, based upon field and laboratory tests. Phytotoxic symptoms include marginal necrosis, leaf spotting, leaf drop, and fruit drop. Specific apple varieties that have had problems include:

Akane	Cox's Orange Pippin	GoldRush	McCoun	Royal Gala	Suncrisp
Asahi	Discovery	Jonamac	Molly Delicious	Silken	Zestar!
Braeburn	Gala	Kent	Mondia	Spartan	CG.179 rootstock
Bramley	Galaxy	Kizashi	Ontario	SpiGold	EMLA 26 rootstock
Celbarestival	Grimes Imperial	Lurared	Permain	Starkspur Mac	
Cortland	Hampshire	McIntosh	Queen Cox	Summared	






Facts for Fancy Fruit is a newsletter for commercial and advanced amateur fruit growers. It provides timely information on pest control, production practices, and other topics likely to be of interest to fruit growers. All growers and interested persons are welcome to subscribe.

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<i>Current bud stages West Lafayette, IN</i>		
Apple	Blackberry	Grape
		
<i>at 40 mm</i>	<i>pre-harvest stage (red fruit)</i>	<i>"cluster close" or beyond</i>
Peach		Raspberry
		
<i>about 10 days behind normal</i>		<i>at harvest</i>

damage. In this study, the following cultivars were found to not be sensitive to azoxystrobin: Arlet, Carousel, Creston, Enterprise, Fortune, Fuji, Gala Supreme, Ginger Gold, Orin, Pristine, Rome Beauty, Sansa, Shizuka, Yataka, and York Imperial.

In order to prevent a repeat of the problems observed in 1997, the following statements have been added to the azoxystrobin label under the general use precaution section: "Azoxystrobin (Quadris) has been shown to be extremely phytotoxic to certain apple varieties. Azoxystrobin should not be applied where there is the possibility of spray drift reaching apple trees. Sprayers used to apply azoxystrobin should not be used to spray apples." (Beckerman)

References:

Bazuin, J. 1999. Azoxystrobin found to be phytotoxic to certain varieties of apples. U.S. E.P.A. Pesticide Program Update 21 June 1999

Crassweller, R. M. and D. E. Smith. 2003. Apple cultivar sensitivity to azoxystrobin fungicide. J.

Amer. Pomological Society. 57:166-168

Rosenberger, D. Causes of early summer leaf spots. II. Phytotoxicity. Scaffolds, June 5, 2006 at: <http://www.nysaes.cornell.edu/ent/scaffolds/2006/060605.html>

Tissue Analysis Grapes and Small Fruits

Plant nutritional status is important for all phases of plant growth and has a direct effect on vigor, fruitfulness, cold hardiness, and other factors. Tissue analysis is the most reliable means of determining plant nutritional status. Combined with soil testing, tissue analysis can help pinpoint the source of problems and determine what measures may be needed to ensure proper nutrition of the crop. Tissue analysis samples should be collected at the appropriate time to give the most meaningful results. For strawberry, sample the first fully expanded leaves after renovation, usually in mid to late July. For brambles, sample leaves on non-fruiting canes (primocanes) between August 1 and 20. For

blueberries sample leaves during the first week of harvest. For grapes, samples should be taken about 70 days after full bloom, usually early to mid August. Samples should be adequate in size. Collect 30-60 leaves for strawberries, brambles, and blueberries, and 100 leaf petioles for grapes (for grapes submit only the leaf petiole, or stem, for analysis, discard the leaf blade). Collect samples to represent the entire field, not just from a few plants. Sample different varieties separately. If specific problems exist, collect separate samples from both normal and problematic areas of the planting. After collection, leaves should be washed gently to remove any pesticide residues and dust that might affect analysis, laid out to dry for a couple of days, then bagged in paper bags for submission to the lab. Some labs offer tissue analysis sample kits.

There are several private companies and a few universities that provide tissue analysis. A list of certified soil and plant analysis testing labs serving Indiana growers is located at <http://www.agry.purdue.edu/ext/soiltest.html>. The

Midwest Small Fruit Pest Management Handbook has a chapter on tissue analysis and fertilizer recommendations. It is available on line at <http://www.hort.purdue.edu/fruitveg/> (Bordelon)

Japanese Beetles on Grapes and Berry Crops

The first of this year's Japanese beetles started to emerge in the Lafayette in late June. Growers familiar with this pest know that they have a voracious appetite for leaves of a number of crops and non-crops plants, and the fruit of some crops such as blueberries and brambles. Control of adult beetles is relatively easy with insecticide applications. However, due to the continual emergence of adults over a several week period, re-application may be necessary several times during the season. Sevin is the most effective material labeled for use on most fruit crops. The preharvest interval (PHI) on small fruits is 7 days, which can present a problem during harvest. Imidan is moderately effective and has a 3-day PHI, which may help somewhat. Malathion has a 1-day PHI on blueberries and brambles, although it is not the most effective insecticide. Insecticides containing pyrethrum can be used up to the day of harvest, but provide only very short-term control. Insecticides that contain Neem extract appear to have some repellency against Japanese beetle. Be sure to adhere to the preharvest restriction and Restricted Entry Intervals for whatever pesticide you choose to use. Traps are generally not recommended as they likely attract more beetles to the crop area. In recent years research has found that use of soil-applied insecticide, imadiclopid (Admire) at egg-laying will significantly reduce the number of larvae in the soil. However, it is unclear whether reduction of larvae in and around a planting will significantly reduce the number of adults feeding in a planting since they can travel quite a distance to feed. (Foster and Bordelon)

Blueberry Crop Estimate

The Blueberry Growers of Indiana met recently at Zylstra's Blueberry Farm near Demotte. The evening was very enjoyable and thanks go to Bob and Kathryn for hosting the event. The group enjoyed a tour of the farm and a wonderful potluck dinner. Several items were discussed at the BGIN business meeting, including the annual crop estimate. It is estimated that Indiana growers would produce 3.75 million pounds of blueberries this year. About 2.25 million will be for fresh sales and the remainder will go for processing. While prices are still very strong for blueberries, expenses are up as well. Many growers expect that their labor costs will increase at least 25% this year. Consumers can expect a good supply of berries at local u-pick farms, farmers markets and grocery stores. Prices should be in the \$2.00-2.50 per pound range. (Bordelon)

NRCS Structures Held During Flood

The June record rainfall and flooding in the southern half of the state caused hundreds of millions of dollars in damages in both rural and urban settings in Indiana. In rural parts of the state, many farms suffered flooding, erosion or deposition damages... sometimes all three. While there was no way to have controlled all the flood waters, the Natural Resources Conservation Service (NRCS) flood control structures held strong, which reduced flood damages to the rain soaked areas.

"NRCS field staff have been busy inspecting damages, measuring, designing and estimating repair quantities and costs. They have also been talking to landowners about what we can do for them since the June storms hit," said NRCS State Conservationist Jane Hardisty. "So far, we have focused on what the Emergency Watershed Protection Program can do to eliminate threats to people and property from situations that developed in the storm and subsequent flooding. Now, we are turning our

attention to longer term assistance that we can offer."

"We also asked our field staff to take a look at flood prevention measures we designed and installed over the last 50 years to see how they held during the storms," said Mike Cox, state conservation engineer for the agency. "NRCS has 134 dams throughout central and southern Indiana that were built under the PL83-566 Flood Prevention Program. Our first two dams were completed in 1959 in Washington County, and our most recent addition was completed in 2004 in Clark County. All of the dams were built for flood prevention, and many of them are multi-purpose structures adding water supply, recreation, wildlife habitat in addition to their primary flood prevention purpose. A majority of NRCS dams throughout Indiana can store nearly 13 inches of rainfall before storm water might overtop the dam. Some dams, designed as 'High Hazard,' can store over 27 inches of rainfall before the dam would overtop."

As flood prevention structures, engineering design and specifications are of primary importance in these dams. With years of heavy rainfalls, the attention to detail and adherence to good construction methods has paid off in that none of the NRCS flood prevention dams in Indiana have failed. Even at the point of overtopping, water flowing through the primary and auxiliary spillways in the NRCS flood protection dams is at full flow, quickly lowering storm water levels in the lake pool. Dams are designed so that if overtopping takes place, the shallow water flows over a wide area, spreading out the possibility of any concentrated damage. The auxiliary spillways are wide, flat earthen spillways covered in grasses or other vegetation to help stabilize them.

Under the intense precipitation during the first week of June 2008, the Indiana NRCS dams "weathered" the storms well. As these storms

crossed central Indiana, heavy rainfall fell in watersheds affecting around 44 dams in Parke, Putnam, Vigo, Sullivan, and Greene counties. NRCS staff visited a Putnam County dam on Sunday, June 8, where the lake pool was quite high, just two feet below the auxiliary spillway (sometimes referred to as the emergency spillway). For some dams in Vigo and Sullivan counties, the lake pool rose high enough to activate or flow through the auxiliary spillway. As the water flowed through the earthen spillway outlets and moved toward the stream below, it caused only minor rutting and erosion of the slope and the channel banks of the stream below the dam.

Even with the dramatic depth and force of flooding throughout central and southern Indiana, NRCS dams held strong. They protected property, roads and bridges downstream of the dams, and reduced downstream flooding damages in their watershed. Local Conservancy Districts are to be commended for carrying out their responsibilities in the maintenance of the dams and their structures.

(Pam Davidson, NRCS Indiana)

Upcoming Meetings

September 9

Berry Sensory Analysis Workshop for grape growers. Marion County Purdue Cooperative Extension Office, Intech Park. Indianapolis. Contact Bruce Bordelon for details. Pre-registration is required and space is limited.

August 21-22

U.S. Apple Association Outlook Conference, Chicago. For more details:

<http://www.usapple.org/industry/outlook-conference/index.cfm>

Oct. 5-9

High Tunnel Tour of England. A 5-day bus tour of high tunnel culture in England for growers, Extension folks, or any other interested

people. Cost is \$800 per person (\$700 double), which includes most meals and all lodging (flight to London not included). We will tour cherries, raspberries, and strawberries and possibly other crops under tunnels. Deadline for registration is August 22. Full details and registration forms are posted at: <http://www.hrt.msu.edu/TUNNELTOUR/>

Nov. 6-8

Southeast Strawberry Expo, Hilton Charlotte University Place, Charlotte, NC. Includes Strawberry Plasticulture Workshop for New Growers, farm tour, educational sessions, and trade show. For more information, email info@ncstrawberry.com

Dec 8-10

North American Raspberry & Blackberry Conference. DeVos Place Convention Center, Grand Rapids, MI, as part of the Great Lakes Expo. For more information, email info@raspberryblackberry.com

Dec. 9-11

Great Lakes Fruit, Vegetable and Farm Market Expo, DeVos Place Convention Center, Grand Rapids, <http://www.glexpo.com/>

2009

Jan. 5-6

Kentucky Fruit & Vegetable Conference & Trade Show, Embassy Suites Hotel, Lexington, KY. For more information contact John Strang at phone 859-257-5685 or email: jstrang@uky.edu

January 12-14

OPGMA Congress, The Nia Center at the Kalahari Resort Sandusky, Ohio

Jan. 19

Beginning apple growing workshop. Adam's Mark Hotel, Indianapolis.

Jan. 19-21

Indiana Horticultural Congress, Adam's Mark

Hotel, Indianapolis. As details become available, they will be posted at: www.inhortcongress.org



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