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FFF05-03

June 1, 2005

Crop Conditions: The weather has warmed up again and most crops are developing well. The thinning window for apples is starting to close. Fireblight outbreaks are starting to show up in the southern areas of the state.

IHS Summer Tour: The summer tour of the Indiana Hort. Society will be held at Apple Hill Orchard near Vincennes, IN. Joe Black and his family established their orchard of 24 apple and 14 peach cultivars 5 years ago and already have a highly productive orchard and thriving farm market. There are plenty of good things to see so plan on joining us, but for now write the dates on your calendar.

Thursday, June 30 at 4.00 pm. There will be a tour of the market, discussion on farm marketing and a cookout with social time.

Friday, July 1 at 8.30 am. Orchard tour.

Full details of the orchard will be in the next FFF, along with directions. We hope to see you there.

Hort Farm Closing Down - Equipment For Sale: From July 1, the old Purdue Hort. Farm will cease to exist. Well only cease to exist as a fruit research farm – it will be officially transferred to the Department of Forestry and Natural Resources at Purdue. Fruit research will continue at Purdue of course, and for the last 6 years we have been establishing research plots at the Meigs farm. Financial support

from the Return Bloom Fund has been critically important in helping us establish apple plantings at this brand new farm. These funds have also been extremely useful in helping us free up money from other sources to help us buy new equipment. We appreciate the support of all who have contributed to this fund.

While a significant amount of the equipment from the hort farm will be used in our research at other locations, some of the items from the hort farm are now no longer needed. We are offering these for sale to the industry. The largest items are:
 Cider mill – Shinko press, 300 gal and 400 gal refrigerated tanks, bin dumper, elevator, and jug filler.

Packing line – an old (1959) Wayland fruit sizer with grader and bagger line.

There are a number of smaller items also. A full list can be seen at:
<http://www.hort.purdue.edu/hortfarm.html>

We will accept sealed bids for these items that must be postmarked no later than June 20. Full details are available on the website listed above. Contact the manager of the hort

farm, Burk Thompson (phone 765-494-3995, email: thompson@hort.purdue.edu) to make an appointment to view any of the items.

Grape Cold Damage Report: A survey of growers and quick trips across the state revealed mixed results from the early May frost events and from the Christmas freeze. Some vineyards have fairly severe winter injury on tender varieties such as Chambourcin, Vidal, and Traminette from temperatures that dropped into the -10 to -15°F range in late December. This event coincided with record snowfall across the southern part of the state. Other vineyards completely escaped this damage. It's difficult to understand why, but it was likely due to variations in crop load, vine health, fall hardening conditions, etc. and the fact that relatively warm temperatures preceded the cold temperatures. Damage from the May frost events is generally worse in lower lying areas and on early budding varieties, but not in all cases. I estimate that some growers lost 70-90% of their crop in some blocks, and less than 10% in others. These frost events were generally just at the temperature threshold where we would expect damage, about 27°F. In some cases, just the edges of the leaves were killed, and the clusters and shoots survived. In other cases, the growing tip and clusters were killed, but the shoot is still alive and lateral buds at the lower 2 or 3 nodes are pushing. In the most extreme cases, the entire primary shoot was killed and secondary buds are growing. Even in blocks with minimal crop, maintaining good foliage health through pest management and nutrition will be important this year, to assure a good crop next year. (Bordelon)

Topsin M and Indar Receive Section 18 Exemption for Use on Blueberries: EPA has granted a section 18 Specific Exemption for thiophanate methyl (Topsin M WSB) and fenbuconazole (Indar) fungicides for use on blueberries in Indiana for the 2005 growing season. Indar is used for mummyberry control and Topsin M is used for control of mummyberry disease, Botrytis blossom blight, anthracnose fruit rot, Phomopsis twig blight and canker, and Fusarium canker. Copies of the supplemental labels in printable PDF format are available on the Midwest Small Fruit and Grape Spray Guide website at www.hort.purdue.edu/hort/ext/sfg under "Recent Updates" link. If you have questions about section 18 exemptions for pesticides, contact the Indiana State Chemist at 765-494-1587. (Bordelon)

Important Grape Sprays: Grapes are approaching bloom across the state. The next few fungicide applications are very important for controlling the major fruit pathogens. The immediate pre-bloom (or early bloom) and the first two post bloom applications are the most important sprays for controlling black rot, but also are important for downy and powdery mildew. Care should be taken to get thorough coverage of all foliage and developing fruit. Slow the tractor speed, spray every row middle, increase volume, and use full label rates. This would be a good time to use one of the strobilurin fungicides such as Abound, Sovran, or Pristine. On Botrytis bunch rot susceptible varieties, addition of a botryocide such as Rovral, Vanguard, or Elevate in the bloom spray may be beneficial. For a complete discussion of grape pest management refer to the Commercial Small Fruit and Grape Spray Guide (<http://www.hort.purdue.edu/hort/ext/sfg/>) and the Midwest Small Fruit Pest Management Handbook (<http://www.ag.ohio-state.edu/~sfgnet/>). (Bordelon)

Crop Load Adjustment in Grapes: Annual pruning of grapes is necessary to balance the amount of fruit production with the amount of vegetative growth to insure economic yields of high quality fruit. Pruning severity is based on the strategy of 'balanced pruning,' which dictates the correct number of buds to retain, or 'crop load,' which determines the number of clusters to retain. Both methods are based on the vine's pruning weight or 'vine size', which is an indication of the vine's capacity to ripen the crop. Many growers prune vines lightly during the early spring to assure adequate bud number following this year's winter injury, and in case of damage by a late frost or freeze. Now that the danger of frost and freeze is over and grape shoots are growing rapidly, growers should go back through the vineyard and determine if crop load adjustment is needed. The crop load is adjusted by removing shoots and/or clusters. New shoots are easily broken off by hand without the need for pruners. Growers should pay close attention to the fruitfulness of shoots. Shoots from primary buds have full fruiting potential, whereas secondary buds and latent buds on older wood produce shoots with little or no fruiting potential, depending on cultivar. Ordinarily, all secondary shoots and shoots from older wood should be removed. However, on varieties that may have suffered winter injury or frost damage this year, the secondary shoots may be the only shoots available. Shoots should be spaced evenly along

the trellis if possible and at a density of about four to six shoots per foot of row. Cluster thinning (removing one or more of the clusters on each shoot) done before bloom results in the least yield reduction because the remaining cluster(s) generally set more berries. However, on tight clustered cultivars, cluster thinning after bloom can result in looser, less rot susceptible clusters. Keeping records of average cluster weights and vine yields can help determine the appropriate amount of fruit to retain now. (Bordelon)

Phosphorous Acid Fungicides: Source: Annemiek Schilder, Michigan State University Plant Pathology, Fruit Crop Advisory Team Alert, Vol. 20, No. 5, May 10, 2005

Recently, a number of new fungicides that have phosphorous acid as the active ingredient have come on the market. Other names that you might hear for this group are phosphonates or phosphates. Examples are ProPhyt, Phostrol and Agri-Fos. Aliette (fosetyl-Al), an older fungicide, is the prototype for this group of fungicides. However, the long-standing patent on Aliette had prevented similar fungicides from being developed up until recently. In Australia, where the patent did not apply, growers have been using these types of fungicides for over a decade.

The term "phosphorous acid" should not be confused with phosphoric acid or phosphorus (P), a fertilizer component. In fertilizers, P is normally found in the form of phosphoric acid (H_3PO_4), which readily disassociates to release hydrogen phosphate (HPO_4^-) and dihydrogen phosphate ($H_2PO_4^-$). Both of these ions may be taken up by the plant and are mobile once inside the plant. Phosphorous acid is H_3PO_3 .

A single letter difference in the name of a chemical compound can make a major difference in its properties. Phosphorous acid releases the phosphonate ion (HPO_3^{2-} ; also called phosphite) upon disassociation. Phosphonate is easily taken up and translocated inside the plant. Phosphorous acid does not get converted into phosphate, which is the primary source of P for plants.

Because phosphorous acid and its derivatives do not get metabolized in plants, they are fairly stable and probably contribute little or nothing to P nutritional needs of the plants.

Some researchers have investigated the ability of phosphorous acid to act as a nutrient source for plant growth and found that P-deficiency symptoms developed with phosphorous acid as the sole source of P. This means that although phosphorous acid can control diseases, it is not a substitute for P fertilization. The inverse is also true: phosphate is an excellent source of P for plant growth, but is unable to control diseases other than improving the general health of the crop. So applying high amounts of P fertilizer will not work as a disease control measure.

Researchers have found that phosphorous acid fungicides are especially effective against Oomycete pathogens, such as Phytophthora, Pythium, and downy mildews in a number of crops. Phosphorous acid has both a direct and an indirect effect on these pathogens. It inhibits a particular process (oxidative phosphorylation). In addition, some evidence suggests that phosphorous acid has an indirect effect by stimulating the plants natural defense response against pathogen attack. This probably explains the much broader spectrum of activity observed in fungicide efficacy trials in small fruit crops in Michigan. We've found, for instance, that ProPhyt had efficacy against downy mildew, Phomopsis, and black rot (but not much against powdery mildew) in grapes. We also have evidence of activity of these compounds against anthracnose in blueberries.

The phosphonate ion is highly systemic and fairly stable in plants. The systemic activity allows them to be applied as foliar fungicides for prevention of Phytophthora and Pythium root rots. They also display curative activity. In general, applications every 14 days seem to be effective in grapes, but follow label directions. These fungicides are sold as solutions of potassium and/or sodium salts of phosphorous acid. To compare them, one should look at the phosphorous acid equivalent, which should be listed on the label.

Prices range from about \$25 to \$35 per gallon, and the application rate ranges from 2 to 5 pt/acre (\$6.25 to \$22 per acre, depending on the product and rate). Under high disease pressure, higher rates may need to be used and spray intervals tightened. Since these fungicides are actually in salt form, care must be taken not to exceed a certain concentration, as crop injury may result.

In addition, if the concentration is too high, the pH may become so low that in tank mixes with copper products (particularly copper hydroxide such as Kocide), too much copper will become available and result in crop injury.

Blueberry Fruitworms: Deploy Monitoring Traps Now: Source: Rufus Isaacs, Michigan State University Entomology, Fruit Crop Advisory Team Alert, Vol. 20, No. 5, May 10, 2005

There are two species of fruitworms that can infest blueberries in Michigan: the cherry fruitworm and the cranberry fruitworm (see images at http://www.ipm.msu.edu/CAT05_frt/F051005fruitworm.htm). The larvae can be found inside young blueberry fruit during and after bloom, but their presence is often not evident until the premature ripening of infested berries, or the webbing of berries together by cranberry fruitworm are noticed. However, an Integrated Pest Management approach using monitoring for moths, scouting, and appropriate application of effective controls can prevent fruit contamination by these pests.

Regular weekly scouting in blueberry fields across west Michigan as part of our RAMP Project indicates that the flight of cherry fruitworm moths has just started. All our monitoring traps were empty one week ago, and yesterday male cherry fruitworm moths were trapped at a farm in Grand Junction.

So, if not already deployed, monitoring traps for cherry fruitworm and cranberry fruitworm should be placed in fields this week.

In recent years, some fields have experienced high pressure from cherry fruitworm, and it is worth monitoring for both moth species if this has been your experience. Cherry fruitworm emergence usually precedes cranberry fruitworm by up to a week.

To monitor for these pests, hang traps baited with a pheromone lure in the top third of the bush. Deploy one trap for each species per five acres of field with traps placed on bushes along wooded borders or areas where fruitworms were a problem last year. Traps should be checked weekly and the moths counted and removed. Writing the number trapped on the bottom of the trap is one way to keep track of the developing population.

Pheromone traps are very specific, but it is important to know what the species you are

monitoring looks like. See the image link above in this article for the correct species to identify. Contaminant moths have been caught in cherry fruitworm traps at most of the farms we are scouting in Van Buren County, but these should not be confused with cherry fruitworm. These contaminants are *Pseudexentra vaccinii*, which are longer and lighter-colored than cherry fruitworm with a distinctive pattern.

The monitoring traps catch male moths, but because females lay the eggs, controls should be delayed until egg laying starts. This is usually soon after petal fall begins, so in high-pressure fields an insecticide may be warranted during bloom, limiting growers' choices of what to apply. If pressure is lighter or if bush development is faster than the moths, growers may be able to wait until the immediate post-bloom timing to control fruitworms.

Fire Blight Alert: As we go to press it's not certain but, recent grower reports from Kentucky and southern Indiana are indicating that this could be a bad year for fire blight. Expect fire blight symptoms to begin showing about May 15 in southern Indiana, move on to central Indiana about June first and hit northern Indiana by mid June. Growers in southern Indiana should be scouting their orchards NOW. Be especially diligent in patrolling young blocks of apples (<5-7 yrs old) for the first symptoms of fire blight, wilted terminal tip ends. Cut out blighted twigs 10 to 12 inches below any sign of infection, being sure to sterilize pruning tools between each cut. If the infected shoot is associated with the main trunk or a major scaffolding limb you may want to try the "ugly stub" cut, deliberately leaving a naked 4 inch branch stub above the supporting limb. Marking the ugly stubs with flags or a bright colored paint when the cuts are made can help in relocating them during the winter pruning operation. And remember, when severe windstorms or rainstorms with or without hail occur during peak fire blight season (now), apply streptomycin within 24 hours...the sooner it is applied the better. (Pecknold)

Powdery Mildew of Apple: While most fungal diseases do best with wet conditions, the one exception is powdery mildew. Powdery mildew is more prevalent during years when weather is dry and the previous winter has been mild. Keep a close watch for the first symptoms of powdery mildew, especially on those inner, shaded, water sprouts. Growers of mildew susceptible varieties such as Jonathan,

Rome Beauty, and Ida Red (my favorite disease apple) should be especially watchful. The tight cluster, pink, bloom, petal fall and first cover sprays are most critical for controlling mildew, but fungicide protection is needed until terminal buds are set. Your best mildewcides are the SI fungicides (Bayleton, Nova, Rubigan and Procure) and the strobilurins, Sovran and Flint. Good old captan, Vanguard, Polyram and mancozeb products do not provide adequate control of powdery mildew. I especially like the use of Sovran or Flint at first cover, not only do you get control of powdery mildew but you also get good control of fruit scab and an early start on sooty blotch and flyspeck. (Pecknold)

EBDC Fungicides: We strongly suggest that growers calculate the 77 days to harvest date for each of their major cultivars and make the final application of EBDC fungicide (Dithane M-45, Manzate 200, Penncozeb, Polyram) on that date to take full advantage of the excellent control these fungicides provide for sooty blotch and flyspeck. In the Lafayette area this would make July 20th the final spray date assuming harvest occurs October 4th (unless I counted my days wrong). This recommendation applies only to growers who used the low rate of mancozeb - 3 lbs/acre. Refer to page 13 of ID-168, "2005 Indiana Commercial Tree Fruit Spray Guide", for further information. (Pecknold)

Peach Scab: Early shuck-split and shuck-fall sprays are critical for peach scab control. The first spray should be applied about one week after petal fall. Do not wait until the shucks have slipped to begin this program. Continue to spray on a 10-day interval until 40 days before harvest. See ID-168, "2005 Indiana Commercial Tree Fruit Spray Guide", for further information. (Pecknold)

Codling Moth Management: For years I have been recommending that growers use codling moth pheromone traps to establish a biofix (the time when we know codling moths are active because we've caught several in traps) and then using degree days to predict egg hatch so that you can better time our insecticide applications. In "normal" years, this usually works out to be about 2 weeks after petal fall, which coincides fairly nicely with the spray interval that many growers use. However, 2005 has proven to be a different situation, at least here in Lafayette.

Early April's warm weather took us rapidly through the various growth stages leading up

to bloom. I missed a treatment in one of my studies because we were only in pink for 1 day. Then it got really cold, lows around 28 degrees here and insect development slowed down. I reached biofix here on May 16, a full week later than the May 9 biofix for 2004. We have now started accumulating degree-days to predict egg hatch. Most insecticides should be applied at about 150 degree days (base 50) after biofix. What that means is that a calendar spray two weeks after petal fall (May 4) would have gone on May 18th, but we are still quite a ways from being ready to spray based on degree days. Had we sprayed on May 18th, much of our insecticide residue would have dissipated before egg hatch, and our level of control would have been reduced.

The point of this discussion is to remind growers of the potential benefit of using codling moth pheromone traps and degree days to time insecticide sprays. Traps are relatively cheap (compare costs to some of the newer insecticides) and easy to operate. In some years, you may not change your application date by more than a day or two, but in years like this, it may be as much as a week. (Foster)

Rosy Apple Aphids: In general, aphids prefer cool weather. The generally cool temperatures we have had over the last several weeks have been fairly ideal for rosy apple aphids. I have seen damaging infestations in some orchards. Rosy apple aphid is the most serious aphid pest on apples because in addition to the direct feeding damage, they inject a toxin into the leaves through their saliva that moves to nearby fruit, causing them to abort or be small or poorly shaped. Some insecticide choices include Dimethoate, Thiodan, Danitol, Esteem, Assail, Calypso, diazinon, and Provado. See the following article for insecticide choices. (Foster)

Killing Two Bugs With One Stone: Our insect management programs in apples must be built around the codling moth, because it is a consistent threat to the marketability of our crops. In past years, when some of the less consistent pests showed up, such as spotted tentiform leafminer, rosy apple aphid, or leafhoppers, we could not control them with the organophosphate insecticides (Guthion, Imidan predominantly) that were the backbone of our codling moth program. As a result, we had to make a special application of an insecticide (sometimes very expensive) to control one or more of those pests, in addition to continuing

with our codling moth insecticides. However, some of the newer insecticides for codling moth control will also control some of the other pests. If you have a problem with one of these secondary pests, I would recommend that you seriously consider substituting one of the newer insecticides for your regular codling moth spray, taking care of codling moths and the secondary pests at the same time. The following table summarizes efficacy of several insecticides for codling moth and the secondary pests, as well as the potential impact on predatory mites. These ratings were compiled from results from entomologists in a number of states around the Midwest.

Trade Name	CM	PC	RAA	STLM	LH	PM
Guthion	E	E	P	P-A	P	ST
Imidan	G	G	P	P-A	P	ST
Asana	E	G	F	E-A	G	HT
Danitol	G	G	G	E-L	E	MT
Warrior/Proaxis	G	G	?	E-A, F-L	E	HT
Assail	E	G	E	E-A, F-L	E	MT
Calypso	E	G	?	?	?	MT
Intrepid	G	P	P	G-L	P	ST
SpinTor/Entrust	F-G	P	P	E-L	P	ST

E = Excellent; G = Good; F = Fair; P = Poor; ? = Unknown or not labeled.
 CM = Codling moth; PC = Plum curculio; RAA = Rosy apple aphid; STLM = Spotted tentiform leafminer (A = Adult; L = Larvae); LH = Leafhoppers; PM = Predator mites (ST = Slightly toxic; MT = Moderately Toxic; HT = Highly Toxic)

My guess would be that Calypso will act pretty much like Assail in control of the secondary pests, but we haven't been testing it long enough to have a track record.

Before you apply an insecticide, always ask yourself "What insects am I trying to control with this application?" At petal fall, you will always be targeting plum curculio. At first cover (see codling moth article above), you will be targeting plum curculio and codling moth. At second cover, codling moth is the target. At third and fourth cover, you may be targeting some straggling codling moths, some early apple maggots, or possibly neither. In addition, by scouting your orchard you can see which of the secondary pests may be present and need to be controlled. Be sure you know what you are trying to accomplish with each spray and choose the insecticide that will help you achieve your goals.

If your only targets are plum curculio and/or codling moth, Imidan and Guthion are still excellent choices because of their efficacy against those pests, their relatively low cost, and their low toxicity to predator mites. If you add leafhoppers to the target list, I would seriously consider Danitol, Assail, or Calypso. Assail and Calypso will likely provide excellent control of rosy apple aphids. There are several good choices for leafminer adults or larvae. I am still resistant to using the pyrethroids (Asana, Warrior, Proaxis) because of their effect on predator mites. (Foster)

National Added Value Ag Conference: Indianapolis is host to the 7th annual National Added Value Ag Conference, June 16-17, 2005. This event is co-chaired by Deb Conley of the Indiana Cooperative Development Center and Jerry Nelson of the Purdue University Extension New Ventures Team. According to their website: "For some it's learning about state-of-the-art approaches to working with value-added ag ventures; for others, it's the opportunity to hear and dialogue with nationally-known speakers, for others, it's building our portfolio of "success stories;" for others, it's a networking opportunity with colleagues. For all, it's a celebration of our unique profession. Whatever your reason, prepare to join us at the 7th Annual National Value-added Ag Conference this June 16 & 17 at the Adams Mark Hotel in Indianapolis, Indiana! Our conference is full of presentations and interactive group discussions on the latest, freshest thinking about our work with entrepreneurs. Part of our mission that we have taken up is to challenge the old assumptions, stretch our thinking, and provide new tools and methods in order to improve our effectiveness with those we serve."

After June 1 the registration is \$150. For more information, refer to: <http://www.agecon.purdue.edu/AICC/valueaddconf/>

IDFTA Summer Tour, New Jersey: The International Dwarf Fruit Tree Association (IDFTA) is visiting New Jersey for their summer meeting this year, which runs June 27-28, 2005. New Jersey grows about 7000 acres of peaches and 2500 acres of apples. Retail fruit marketing is big in New Jersey, and many of the stops on the tour will highlight this. Over 2 days, participants will visit 5 farms and the Union Square Tailgate Market in New York City. The farms selected for the tour are progressive farms, growing intensive orchards on dwarfing rootstocks, and also have well developed farm markets. Many of the activities of these farm retail businesses are likely to be of direct and immediate interest to growers and retail farm marketers in Indiana. More information can be found at <http://www.idfta.org/> (Hirst)

Food Safety Resources Still Available:

Haven't requested your free Hand washing Poster, Farm worker Training Video, or Good Agricultural Practices Farm Assessment book yet? Still trying to decide when or whether to schedule a free on-farm consultation about food safety? It's not too late! IVGA members, watch your mail for an order form. Other Indiana growers, call 219-785-5673 to request an order form and more information about the Ohio and Indiana Specialty Crop Food Safety Initiative. Or follow the link from the Fruit and Vegetable Connection Web site www.hort.purdue.edu/fruitveg (Liz Maynard)

Disease-fighting chemicals in apples could reduce the risk of breast cancer: An apple a day can help keep breast cancer away, according to a study in rats by food scientists at Cornell University. "We found that tumor incidence was reduced by 17, 39 and 44 percent in rats fed the human equivalent of one, three or six apples a day, respectively, over 24 weeks," says Rui Hai Liu, Cornell associate professor of food science and lead author of the study. The Cornell researchers treated a group of rats with a known mammary carcinogen and then fed them either whole apple extracts or control extracts. Liu, who says this is the first study of the effects of apples on cancer prevention in animals, also found that the number of tumors was reduced by 25, 25 and 61 percent in rats fed, respectively, the equivalent of one, three

or six apples a day. The report is published online at <<http://pubs.acs.org/cgi-bin/abstract.cgi/jafcau/asap/abs/jf058010c.html>> and will be published later this month in the Journal of Agricultural and Food Chemistry.

In an article in the journal Nature five years ago, Liu and his colleagues credited phytochemicals – antioxidants – in fresh apples with inhibiting human liver and colon cancer cell growth. Antioxidants help prevent cancer by mopping up cell-damaging free radicals and inhibiting the production of reactive substances that could damage normal cells.

"Studies increasingly provide evidence that it is the additive and synergistic effects of the phytochemicals present in fruits and vegetables that are responsible for their potent antioxidant and anticancer activities," Liu says. (From Cornell University)

Upcoming Meetings:

June 8-Sept 28: Agri-tourism workshops at various locations around the state. See article in the last issue of FFF.

June 10: Workshop, "Exploring Opportunities in Specialty Markets". See article in the 2005-01 issue of FFF.

June 13: The Indiana Winegrowers' Guild Summer meeting will be held at French Lick Winery in French Lick. More info later.

June 14: Blueberry Growers of Indiana Summer Meeting. Van Kley's Blueberries, 2666 W. State Rd. 10, Wheatfield, IN. Contact Melvin Van Kley at 219-956-3687 or 219-863-4208. Gather for farm tour at 4:00 pm, Potluck dinner at 5:00 pm (Meat and drink provided, please bring a dish to share), BEGIN business meeting at 6:00 pm. MBG Marketing meeting at 6:30 pm.

June 28-29: Farm Management Tour at Hubers and other horticultural operations in Clark Co. sponsored by the Purdue Agricultural Economics Department.

June 30-July 1: Indiana Horticultural Society summer meeting. Apple Hill Orchard, near Vincennes. More details in the next issue of FFF

August 5: Workshop, "Exploring Opportunities in Specialty Markets". See article in the last issue of FFF.

Department of Horticulture &
Landscape Architecture
Purdue University
625 Agriculture Mall Drive
West Lafayette, IN 47907-1165

Bruce Bordelon
Dept. of Horticulture &
Landscape Architecture
Purdue University
625 Agriculture Mall Drive
West Lafayette, IN 47907-2010
765/494-1301
e-mail: bordelon@purdue.edu

Paul Pecknold
Dept. of Botany & Plant Path.
Purdue University
915 West State Street
West Lafayette, IN 47907-1155
765/494-4628
e-mail: pecknold@purdue.edu

Peter Hirst
Dept. of Horticulture &
Landscape Architecture
Purdue University
625 Agriculture Mall Drive
West Lafayette, IN 47907-2010
765/494-1323
e-mail: hirst@purdue.edu

Rick Foster
Dept. of Entomology
Purdue University
901 W. State St.
West Lafayette, IN 47907-1158
765/494-9572
e-mail: rfoster@purdue.edu

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