Update on Pest Management
and Crop Development

March 19, 2007 VOLUME 16, No. 1 Geneva, NY

GENERAL INFO

JUMPING THROUGH HOOPS

MARCH MADNESS (Art Agnello, Entomology, Geneva)

❖❖ For the first time, the vernal equinox this year occurs after the daylight savings time change (a process that strikes me as akin to the belief that you can make a blanket longer by cutting 12 inches off one end and sewing it onto the other), so it will be harder than normal to be convinced of spring's arrival when the alarm goes off on Wednesday morning. For that matter, winter started so late this year, I'm not convinced it will actually give up without an extra month of NY-flavored seasoning, just to preserve some higher level of symmetry. What I can be sure of is that, even if that were to happen, the Law of Weather Conservation will see to it that at some inconvenient spot along the line, we'd be in for a horrific turbo-warmup to bring us approximately back to normal (or as close as we ever get to it). Which is all just a long way of stating, as I do each year, that this first issue of the year is as good a signal as any that I believe everything's happening right on schedule.

You never call, you never write

I always look forward, perversely, to the unimagined variations on the famous "bounced message" routine when I begin re-using last season's mailing list for this newsletter. Almost everyone has a change in their email address at some point -- always unanticipated, naturally -- and almost nobody bothers to inform most people (except their investment banker and maybe their parents), because it's admittedly a big job trying to cover all the people one communicates with, and if they really want to find you, they'll figure it out eventually. So, if you're not reading this issue and expected to be (you know who you are), it's because you failed to let me know that your Internet Service Provider became a victim of global climate change, of one type or another.

This year marks a bittersweet milestone of sorts, because, as I've been intimating for a few years, from now on, due to rising costs associated with sending out printed copies, we have been forced to go to an all-electronic format beginning this year. This was bound to happen eventually, given the diminishing number of print subscribers we had -- just 15 of our 265 total known subscribers had been receiving the hard copy only. We're sorry that we will be unable to continue sending it as a hard copy, but it was largely a question of economics. (Just think of it as our attempt to become more carbon-neutral.) Instead, We will be sending

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IN THIS ISSUE...

Scaffolds out as a pdf file via email each Tuesday. Naturally, there is also a web version available from the NYSAES server, which is normally up by Tuesday or Wednesday each week, at: http://www.nysaes.cornell.edu/ent/scaffolds

As always, we are happy to consider contributions (particularly from N.Y. sources) in the form of articles on topics in any of the fruit crop protection or crop production areas, as well as N.Y. field observations, trap data, etc.

Speaking of Changes

Evidently, we set too big a precedent last year by delivering the 2006 Pest Management Guidelines for Commercial Tree-Fruit Production well before the Empire State Fruit & Vegetable Expo in mid-February, since we've fallen back this year into the old practice of wondering when the new Recommends will be out. As it happens, production and distribution of this resource has been taken over by the Cornell PMEP (Pesticide Management & Education Program), which actually promises to make the whole process (eventually) more efficient and economical. Once the kinks get worked out. There will also continue to be an online version, at a site to be announced. The latest word is that it is expected to be delivered from the printers by the end of this week. At any rate, don't sweat the details just yet, as I'm sure you're capable of making your first copper, oil, or captan sprays anyway without having the new edition in your hands. And just to give you a preview of some of the notable changes that come to mind from last season, see the Chem News section.❖❖

FRUIT TOUR

NOT MUCH OF A PLOT, BUT WHAT A CAST

(Art Agnello, Entomology, Geneva)

❖❖ Last October, after 4 years of work, we published a new reference that should be of interest to growers, consultants, biologists, extensionists, students, and home fruit growers. The Tree Fruit Field Guide to Insect, Mite, and Disease Pests and Natural Enemies of Eastern North America (Agnello, Chouinard, Firlej, Turechek, Vanoosthuyse, and Vincent) is a 238-page handbook of fact sheet-type entries, including color photos, descriptions and actual-size drawings, distribution, damage symptoms and general management recommendations, to help growers identify pest insects, mites, and diseases that cause damage in the orchard, as well as beneficial insects, spiders, and mites that can be found in tree fruit plantings. It includes over 25 pages of diagnostic keys to insect and mite damage and disease symptoms, a glossary and an index/

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scaffolds
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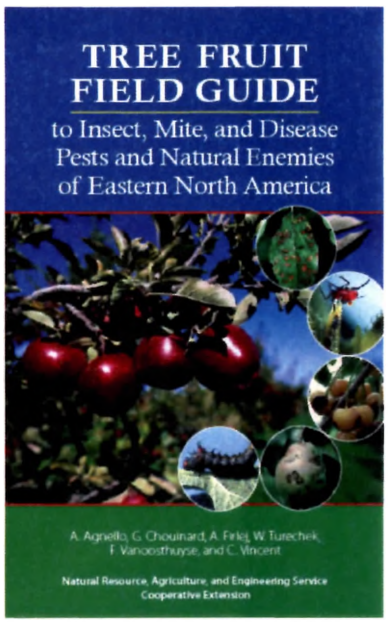

cross-reference to common, scientific, and family names; also, a list of recommended sources for further information, including useful Internet sites. The book is available through NRAES (Natural Resource, Agricultural, and Engineering Service) in Ithaca, through its website: www.nraes.org, and can be ordered online for $32 retail (pub No. NRAES-169). Quantity discounts are available.❖❖

CHEM NEWS

COMING THIS SUMMER

PRODUCT REGISTRATION UPDATE (Art Agnello, Entomology, Geneva)

Label Changes

• I noted this last year, but the new Imidan label (released in January 2006) didn't actually hit the main distribution points until summer. The new Imidan 70WP label changes are mainly in the REI (re-entry interval) and seasonal limits for some crops. All PHIs (pre-harvest intervals) remain the same. The REIs for tree fruit crops went from 24 hours to 3 days.

• Use of Guthion/azinphosmethyl products is now no longer permitted on peaches or nectarines (in addition to plums, prunes, and apricots, which were previously excluded). The registration status for apples, pears and cherries remains the same. In apples and pears, a total of 8 lb formulated product/A is allowed in 2007; this will go to 6 lb/A in 2008–2009, 4 lb/A in 2010, and 3 lb/A in 2011–2012, before being completely phased out. In cherries, it's 3 lb/A in 2008–2009, and 1.5 lb/A in 2010–2012. There is now a 60-ft buffer required from permanent bodies of water and occupied buildings, and a PHI in Pick-Your-Own operations scaled from 33–44 days, according to use rate. Read your labels carefully.

• Lorsban 4EC is labeled in apples, pears and plums for dormant/delayed dormant use only (full-season in cherries and peaches). A supplemental label allows its postbloom use in apples as a trunk spray for borer control. Lorsban 50WS is being replaced by Lorsban 75WG, which may be used up to and including petal fall in apples (as well as postbloom as a trunk spray for borers). It is restricted to prebloom use in pears, peaches and plums; full season in tart cherries.

• Dimethoate has been withdrawn for use on apples; it remains registered in pears.

• Proclaim is a new abamectin-class insecticide from Syngenta, registered in NY last summer, for control of leafrollers in apples and pears.

• Assail is now formulated as a 30SG; the 70WP formulation will soon be phased out completely.

• Kelthane has voluntarily phased out manufacture and distribution of Kelthane. For your information (as it was for mine), New York State does not have an "existing stocks" provision, as do most other states, so once a use has been prohibited, you can't use up existing stocks that have the prohibited use on the label.

• Mitac has been voluntarily cancelled by the manufacturer, with the NYS registration set to expire Sept. 30, 2007.

• Carzol WS no longer registered in NYS; only Carzol 92SP remains labeled.

• Some other products no longer registered in NYS: Pyrellin; D.z.n formulation of Diazinon; Ambush 2EC; rotenone (all formulations), other than for homeowner use; Carbamate; Savey 50WP (replaced by 50DF); Wilthin; K-Salt Fruit Fix 200 and 800; all Thiodan formulations (replaced by "Thionex"); Marathon 8F; Tre-Hold A112; Thiolux.❖❖

INSECTS

COLONY COLLAPSE

BEE DIE OFF
(Nick Calderone, Entomology, Ithaca)

❖❖ Recent reports in the news have highlighted a dramatic loss of honey bee colonies in as many as 24 states. Honey bees are a critical player in the production of many fruit, vegetable and seed crops grown throughout the country; and substantial colony losses, such as are currently being experienced, pose a real threat to growers who rely on bees for pollination. It is not clear whether the current problem, dubbed 'Colony Collapse Disorder' by some, is a new problem, or the result of existing problems that have beleaguered both bees and beekeepers for a number of years. The big problem has been parasitic mites. These mites transmit viruses and cause substantial colony losses each year. These losses reached catastrophic proportions during the winters of 1995–96 and 2000–01, when colony deaths approaching 80% in the northern states were observed. Unfortunately, effective and sustainable controls have not yet been developed for these mites, despite considerable efforts at both state and federal levels.

Pesticide resistance is a major problem that contributes to period catastrophic losses on the scale currently being seen. While the symptoms associated with the current losses are similar to those previously seen with parasitic mites, several groups, including beekeepers, state regulatory agents and scientists from USDA-ARS and university labs, are investigating to determine if some other cause, such as a new pathogen or possible pesticide poisoning, is involved. Whatever the outcome, losses on this scale highlight the fragility of the commercial pollination system and the need to address the needs of the beekeeping industry in order to ensure a continued supply of healthy and affordable foods. Growers should assume that there will be a shortage of colonies for pollination and higher rental fees this spring. Booking colonies as soon as possible is strongly recommended.

Background

Beekeeping is an essential component of modern agriculture, providing pollination services for over 90 commercial crops in the US, including several major crops in New York. The honey bee adds $8 billion worth of value to agricultural crops each year, and nearly $200 million of these benefits accrue directly to growers and consumers of fruit, vegetable and seed crops in New York. Beekeepers and honey bees also provide a background level of pollination that enables home gardeners to produce many of these same crops without having to worry about their pollination requirements; and they play a critical role in many food webs that support wildlife. The role of the beekeeper and managed bees is more important today than ever because parasitic mites have destroyed most of the feral honey bees across the US.

Beekeeping has suffered several major setbacks during the last two decades. First, invasive parasitic mites have decimated honey bee populations throughout the US, creating instability in the supply of bees rented for pollination and greatly increasing the cost of managing bees and renting hives for pollination. The development of pesticide resistance in the mite population has exacerbated this problem. Second, the major bacterial disease affecting honey bees, American foulbrood, has developed resistance to the antibiotic used to prevent it. Although an alternative compound is now available, it is only a matter of time until resistance develops again. Third, cheap, imported honey has maintained strong downward pressure on the prices paid to US honey producers.

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Combined with increased production cost attributable to mites and disease, this has contributed to a reduction in the number of beekeepers and colonies. Finally, the Africanized honey bee has begun to move into regions of the country critical to the sustainability of the US beekeeping industry. These areas, primarily in the southeastern US, are the major wintering grounds for migratory beekeepers and the major source of queen and package bees purchased by northern beekeepers to replace winter losses, which are high. Africanized bees out-compete our traditional European bees in these areas, and as germplasm from this highly defensive race of bees become predominant in the commercial population, colonies will become less manageable.

A weakened beekeeping industry affects not only beekeepers, but also fruit and vegetable growers, and the consumer; and the combined effect of these difficulties contributes to social stress in rural America and increases our dependence on foreign sources of food.❖❖

DISEASES

ORGANIC GROWTH

ORGANIC DISEASE CONTROL FOR APPLES

(David A. Rosenberger, Plant Pathology, Highland)

❖❖ Producing apples organically in northeastern United States is a challenging enterprise that requires great skill and attention to detail. Sulfur, liquid lime-sulfur (LLS), and copper fungicides are the only effective fungicides currently registered for disease control in organic orchards, and these fungicides all have significant limitations compared with most of the conventional fungicides used today. Other products registered for organic disease control on apples have so far proven both less effective and more expensive than sulfur in our eastern climate, where frequent rain events compromise the effectiveness of biocontrols and biorational products.

Copper and sulfur have no curative activity. In that respect, they have the same limitations as captan and mancozeb fungicides. However, copper applied between half-inch green and bloom can cause fruit russetting (Fig. 1), and copper applied between petal fall and early July can cause blackened lenticels on fruit (Fig. 2). Low rates of copper can be used to control summer diseases from mid-July through September, but only a few formulations are labeled for use during summer. Yellow-skinned apples are more prone to skin discoloration from summer copper sprays than red-skinned apples.

Fig. 1: Fruit russetting on Delicious apples that received copper sprays at early tight cluster.

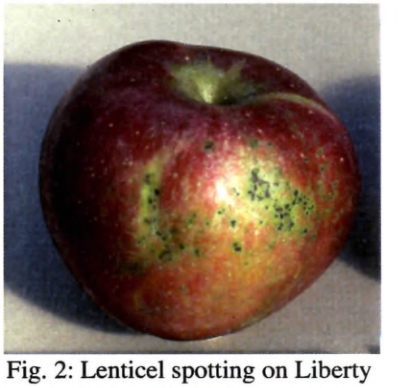

Fig. 2: Lenticel spotting on Liberty apple that received copper sprays during June.

Copper fungicides are being phased out of organic production in Europe, and the future for copper in organic production in the United States is questionable. So long as copper fungicides remain acceptable, they should be used in organic orchards in the first one or two sprays each season to help suppress fire blight and again in late summer sprays to help control summer diseases and fruit rots.

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Sulfur is a good protectant, but it is prone to wash-off during rains. Under most conditions, protection from sulfur will be compromised by an inch of rainfall, and it must therefore be applied frequently in wet seasons. The need for frequent re-applications during long rainy periods is one of the reasons that old-timers sometimes applied sulfur as a dust instead of as a spray. Dusting sulfur adhered well to wet leaves and orchards could be covered more quickly between rains with dusters than with sprayers. The best description I have seen for optimizing uses of wettable sulfur, dusting sulfur, and LLS for scab control was published by Burrell (1945).

LLS is more effective than wettable sulfur for controlling apple scab and flyspeck, but LLS also causes more fruit russetting and depresses yield. Two percent LLS provides 48–72 hr of post-infection activity, depending on temperature. If scab lesions begin appearing on leaves, LLS can be applied to suppress sporulation and "burn out" lesions. In handgun trials at the Hudson Valley Lab, LLS provided good control of sooty blotch and flyspeck when applied on a 10-day schedule at 1 qt/100 gal of dilute spray. However a rate of 2qt/100 gal was required to control sooty blotch and flyspeck when sprays were applied on an 18–20 day interval. LLS at 2.5% is also an effective fruit thinner when applied with oil at petal fall and again 5–7 days later.

The yield-depressing effects of sulfur and lime-sulfur sprays are well documented and have major economic implications for organic production systems that require repeated use of these fungicides. Palmiter and Smock (1954) published results of a 5-year study with McIntosh trees subjected to different spray regimes and showed that trees receiving ferbam fungicide sprays throughout the growing season produced 17% more harvestable fruit (based on boxes/tree) than did similar trees that received sulfur sprays. The yield of fruit that met U.S. No. 1 grade standards was 33% higher for ferbam-treated trees than for sulfur-treated trees. More recently, Holb et al. (2003) ran a two-year trial with Jonagold and Boskoop apples in Holland and found that yields in plots receiving conventional fungicides were 33 and 39% higher, respectively, than yields in comparable plots receiving full-season treatments of wettable sulfur or LLS. In addition to the yield loss, the latter two treatments also reduced the percentage of top-grade fruit by 10–15% compared with conventional fungicides. In a non-replicated trial that we conducted at the Hudson Valley Lab last summer, an organic spray program consisting mostly of sulfur, LLS, and Surround (for insect control) reduced yield of 15 cultivars in our test planting by an average of about 50% compared with comparable trees receiving standard fungicides. In all of these tests, yield differences were attributable solely to fungicide effects because all plots received the same fertilizer and herbicide regimes.

Because of the tremendous yield-suppressing effects of sulfur and LLS, organic apple production is likely to be most successful in orchards that are designed and planted with organic production in mind. Attempts to transition old unprofitable blocks of scab-susceptible varieties into organic production "because the apple will be worth more" is an almost certain recipe for disaster. Instead, organic producers should design new orchards with the following issues in mind:

• Use scab-resistant cultivars if possible. Avoid cultivars such as McIntosh, Jerseymac, Ginger Gold, and Silken that are highly sensitive to apple scab. Paulared, Honeycrisp, Red Delicious, and perhaps even Empire are not fully scab-resistant, but scab on these cultivars will be relatively easy to control in organic orchards. Although Honeycrisp is relatively scab-resistant, we do not yet know if organic fungicides can control summer fruit rots on Honeycrisp.

• Avoid cultivars that are prone to fruit russetting. Some of the critically important pesticides approved for organic farming can exacerbate fruit russetting, so russet-prone varieties such as Golden Delicious often have a very rough fruit finish when produced organically.

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•Locate organic orchards well away from abandoned orchards, hedgerows, and woodlots that can provide inoculum for apple scab, rust diseases, flyspeck and sooty blotch. Sulfur is not very effective against rust diseases, summer diseases, and summer fruit rots. The summer diseases and summer fruit rots will be easier to control in orchards with good air drainage.

• Use dwarfing rootstocks and a tree spacing that will allow good air movement through the orchard and between trees even when the orchard is mature. Annual pruning can help to keep tree canopies open, but pruning cannot compensate for crowded tree spacing.

The following generalized rules may prove useful for managing apple diseases in orchards where sulfur and LLS must be used for scab control and where summer sprays are needed to control flyspeck, sooty blotch, and summer fruit rots:

• Apply materials at recommended rates with adjustments as appropriate for tree row volume.

• For apple scab and fire blight, begin with one or two applications of a copper fungicide.

• For primary scab and rust diseases, apply sulfur (5 lb/100 gal dilute spray) at least weekly beginning after the second copper spray and continuing to mid-June, then use sulfur at 1 lb/100 gal in summer sprays through mid-July. Shorten spray intervals to less than 7 days if spray deposits are weathered by rainfall totaling one inch or more within the week after application. LLS should be applied as an anti-sporulant if primary scab lesions appear on leaves due to coverage failures with wettable sulfur. LLS (2.5%) plus 2% emulsifiable oil can be substituted for sulfur sprays at petal fall and/or first cover if LLS-plus-oil is used to adjust crop load.

• Based on research reports from other states along with my own observations, I suspect that disease control during the latter half of summer is best maintained by alternating sprays containing one percent LLS with sprays containing low rates of copper fungicide beginning about 15 July and continuing until early September (or until the PHI listed on product labels). A copper fungicide in late summer is essential for controlling late summer black rot and bitter rot infections, but repeated copper applications may cause too much phytotoxicity. Options for controlling summer diseases organically requires more research, especially for regions where summer fruit rots are a concern.

Considerable research effort is being directed toward organic apple production at various universities. I have no doubt that we now have both the tools required for producing apples organically in the Northeast. However, I'm not yet convinced that anyone can make a profit growing organic apples in our climate due to the yield suppressive effects of sulfur and lime-sulfur and the high costs for pesticides required for insect control.❖❖

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