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

Newsletter Extension

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Calendar

July21 & 22: Small Fruit Production/Marketing Tour, Wooster/Mt. Hope area. Specific topics and tour locations will be announced in the next few weeks.

Prebloom Preoccupations

Source: Art Agnello & Harvey Reissig, Entomology, Cornell University, Geneva, NY, World Wide Web Site: http://www.nysaes.cornell.edu/ent/scafolds/

Early season arthropod pests--that is, those present before bloom--generally fall into two groups: the mites and everything else. Generally speaking, everyone has to do something about mite populations in their blocks, but not everyone has to do something about the rest of the potential pests, or at least usually not all of them. These include rosy apple aphid, tarnished plant bug, and spotted tentiform leafminer.

We've already given our highly subjective assessment of mite management for the early season, so let's leave fuzzy enough alone for the time being and move on to the insects.

Fortunately, all three of these management issues converge at about the time of Pink, together with a ton of other things, but you're probably used to it by now, and anyway this is the crunch you've been impatiently waiting for since that thaw back in January. The whole key behind a Pink strategy boils down to setting priorities, or else call it degrees of sensitivity, and this is something for which most growers seem to have an inherent talent. Everyone has their own version of this process, and all of them

result from being familiar with your own orchards - does a given block have a history of or susceptibility to a specific pest? Start with your knowledge of the block, use a sampling procedure where appropriate, and make a management decision.

Rosy Apple Aphid

In our opinion, the most crucial of the pest decisions to be made at Pink has to do with rosy apple aphid (RAA), because this is the last defining period for a truly successful rosy management option. Although RAA feeds mainly on apple foliage, causing leaf chlorosis and curling, its saliva is also translocated to nearby fruits, which become bunched, stunted, and malformed. RAA will attack all apple varieties, but varieties such as Cortland, Monroe, R.I. Greening, Idared, and Golden Delicious are particularly susceptible, and those in the McIntosh family are relatively tolerant. As with most aphids, this species has a complex life cycle, starting with black eggs that overwinter on twigs, in bud axils, and in bark crevices. The eggs develop into solitary, wingless "stem mothers", which then give birth to living young, most of which are also wingless. RAA nymphs are visible beginning at about Tight Cluster but are most easily observed at the Pink bud stage.

Our control recommendations for RAA cover the period from Half-Inch Green to the Pink bud stage, using any of a number of materials: Thiodan, Lorsban, Lannate, Vydate, Supracide or Asana, listed roughly in order of increasing harm to beneficial mites. Pink applications of any of these products do a better job than an earlier spray. This is an observation resulting from the fact that, in those cases where aphid populations have built up during early summer on vegetative growth inside the canopy, a Pink spray will have done a more effective job of reducing populations than an earlier treatment at Half-Inch Green. From the standpoint of management practicality, it is therefore easier and more natural to consider the need for aphid control at the time of the Pink spray.

Because RAA populations are highly variable, it is important to assess their densities before making a treatment. In past surveys, approximately 50% of the orchards sampled have ended up requiring treatment. If you are inspecting fruit clusters for STLM eggs at Pink anyway, it is not much more trouble to note the presence of RAA nymphs or damage at the same time. We recommend, however, that a few more clusters be checked for RAA than are required for STLM sampling. Try to select 10 from the interior canopy area of each of 10 trees distributed throughout the block. RAA nymphs are of course present at Pink, and large enough to see without difficulty, but they do occur on the same tree and in the midst of colonies of green apple aphids, which are not usually a problem until the summer.

To distinguish among the species, you can use leaf damage as a cue, as well as the insects' color. RAA nymphs are usually pinkish, sometimes varying to a light brown, slate gray, or greenish black, and the body is covered with a whitish mealy coating. Most importantly, they have pronounced cornicles ("tailpipes") and long antennae (more than half the body length). Green apple aphid nymphs are clearly green, and without the whitish cast. Their cornicles are little more than buttons, and the antennae are clearly less than half of the body length. Also, aphids found inside curled or distorted leaves at Pink are almost always Rosy Apple Aphids. If you find ONE infested cluster (1%, or stop as soon as you find one), we would advise including an RAA material in your Pink spray; this threshold may be a little conservative for people who are skilled at finding the aphids.

Spotted Tentiform Leafminer

What else is happening at Pink (mites aside)? STLM is laying eggs, but most orchards don't suffer too greatly from 1st brood leafminer, and even if so, a sequential sampling plan can be used to classify STLM egg density at Pink or of sap-feeding mines immediately after Petal Fall (see pages 91, 95 or 97

in the Recommends). Treatment is recommended if eggs average 2 or more per leaf on leaves 2, 3, and 4 of a fruit cluster at Pink, or if sap-feeding mines average 1 or more per leaf on these leaves at Petal Fall. Sampling can be completed in approximately 10 minutes. In recent years, only 1 out of 6 sampled orchards have required insecticide treatments to control first-generation STLM populations. Vydate at Pink or Lannate at Petal Fall have been our standard recommendations for this pest; however, now we also have the Petal Fall option of Provado, which will add to the leafhopper control if you don't use enough Sevin at thinning to do an adequate job.

Miscellaneous

Leafrollers are also out there, but only part of the population is active at this time, so it's better to wait for Bloom or Petal Fall to address this one. Tarnished plant bug is the only player left, and you're going to have to decide for yourself whether it's a major concern to you. We have seen few orchards in western N.Y. where TPB control is warranted (slightly more in the Hudson Valley), simply because the most effective treatment to use is a pyrethroid, which a) wipes out predator mites, and b) still rarely lowers TPB damage enough to be economically justified. If you elect an Asana spray at Pink for plant bug, you'll take care of rosy apple aphid (and STLM) at the same time; if rosies are your primary concern, scout for them first, and use Lorsban or Thiodan if you find any.

Testing the Waters

Source: Art Agnello, Entomology, Cornell University, Geneva, NY,

Much of the fruit region is still poking along with the not-quite-warm weather that moved in after the warm spell earlier in the month, so it's as good a time as any to make a run to your distributor's for any supplies you may need to deal with the effects of spray water pH on pesticide activity. As we've said in the past, there may be times when a pesticide application doesn't give you the expected results, even though you used the correct concentration of the recommended material, applied it in the same way that has given acceptable control at other times, and resistance is not suspected. Although it may be tempting to blame a bad batch of chemical or the development of a tough new population strain, the poor results may in fact be due to alkalinity -- that is, a solution with a pH higher than 7.0. A close inspection of pesticide labels often reveals a caution against mixing certain chemicals with alkaline materials such as lime or lime sulfur. Or, even if not, it's wise to keep in mind that above pH 7.0 there is a possibility of the material's degradation. The reason for this is that many pesticides, particularly insecticides, undergo a chemical reaction under alkaline conditions that destroys their effectiveness. This reaction is called alkaline hydrolysis, and it can occur when the pesticide is mixed with alkaline water or other materials that cause a rise in the pH.

Hydrolysis is the splitting of a compound by water in the presence of ions. Water that is alkaline has a larger concentration of hydroxide (OH-) ions than water that is neutral; therefore, alkaline hydrolysis increases as the pH increases. Insecticides are generally more susceptible to alkaline hydrolysis than are fungicides and herbicides, and of these, organophosphates and carbamates are more susceptible than other materials such as pyrethroids. Surveys of fruit-growing areas in N.Y. have shown that water from as many as half of the sites in western N.Y. have pH values above 8.0. Water at this pH could cause problems for compounds that will break down in only slightly alkaline water, such as ethephon (Ethrel). Compounds that break down at a moderate rate at this pH, such as Carzol and Imidan, should be applied soon after mixing to minimize this process in the spray tank. A smaller number of sites have pH levels greater than 8.5. Above this level, the rate of hydrolysis is rapid enough to cause breakdown of

compounds such as Carzol and Imidan if there is any delay in spraying the tank once it is mixed. In a few sites having a pH above 9.0, compounds such as Guthion and malathion, which would not break down in most situations, may have problems. It is also important to note that in any one site, ground water pH can vary substantially (by nearly 2 pH units) during the season.

To prevent alkaline hydrolysis, you should:

1) Determine the pH of your spray solution; because of seasonal variability, this should be done more than once during the growing season. Measuring your spray water pH before mixing is a good start, but it can be misleading, because the chemicals you use can raise or lower the pH of the overall spray solution. It makes more sense to take the time to run some bottle tests of your most-used spray materials after they have been mixed with your spray water. The most accurate method is by using an electronic pH meter; these are not too expensive anymore ($50-60), and have gotten fairly simple to use. Another, less accurate method uses dyes that change color in response to pH. These are available in the form of paper strips, or in solution for use in soil pH test kits. In general, the indicator is mixed with or dipped into the water, and the resulting color is compared against a standard color chart.

2) To minimize loss of chemical effectiveness from hydrolytic breakdown in the tank, it is a good practice to apply right after it is mixed (as much as is allowed by the weather and other factors). If a delay occurs, a buffering agent may be added to the tank if the pH is high and the chemical you are using is susceptible to alkaline hydrolysis; these agents work by lowering the pH and resisting pH change outside of a certain range. A pH in the range of 4-6.5 is recommended for most pesticide sprays. Buffering agents are available from many distributors; some examples are: Buffer-X (Kalo, Inc.), Buffer P.S. (Helena), Spray-Aide (Miller), Sorba-Sprays (Uniroyal/Leffingwell), and LI 700, Choice (Loveland/AgChem Service).

Some sources for pH testing materials are:

pH Meters and Test Strip Kits - Gempler's, 1-800-382-8473

pH Indicator Paper - Ward's Natural Science Inc., 716-359-2502;

VWR, 716-247-0613; Fisher Scientific, 716-464-8904

pH Test Kits - Agronomy Soil Test Lab, 804 Bradfield Hall, Cornell Univ., Ithaca, NY 14853; 607-255-4540.

Growers may add technical flake calcium chloride to the tank when spraying cultivars such as McIntosh, which is susceptible to storage disorders related to inadequate levels of fruit calcium. However, research done in Massachusetts indicates that, although calcium chloride does not itself affect pH, a contaminant present as a result of the manufacturing process does increase the pH of the solution; this could in turn encourage alkaline hydrolysis. There are a few pesticide materials that should not be acidified under any circumstances, owing to their phytotoxic nature at low pH. Sprays containing fixed copper fungicides (including Bordeaux mixture, copper oxide, basic copper sulfate, copper hydroxide, etc.) and lime or lime sulfur should not be acidified. But if the product label tells you to avoid alkaline materials, chances are that the spray mixture will benefit by adjusting the pH to 6.5 or lower.

For further information on water pH and pesticide effectiveness, refer to N.Y. Food & Life Sci. Bull. No. 118, "Preventing decomposition of agricultural chemicals by alkaline hydrolysis in the spray tank", by A. J. Seaman and H. Riedl, from which much of this information was adapted (available from

Communications Services Bulletins, Jordan Hall, N.Y.S. Agric. Expt. Sta., Geneva, NY 14456; 315-787-2249, FAX: 315-787-2276. Cost is $0.50 per copy; make checks payable to "Communications, NYS Agricultural Experiment Station"; postage stamps acceptable for payment of sums less than $1.00).

Blueberry Mulching Materials

Source: Dr. Richard C. Funt, Horticulture & Crop Science, OSU

Most of the literature prefers sawdust mulch for blueberries because of general availability and its beneficial effects as a continuous mulch down the row for the fibrous roots to grow between mineral soils and the mulch. Experience indicates the harmful effects of fresh (green) sawdust, which can burn and damage plants due to the breakdown of the sawdust. Reports indicate that particularly walnut (Black and English) can have toxic effects from the juglone (5-hydrox-alphanaphaquinone). Blueberry plants are sensitive to juglone. Maple can also cause similar problems (high tannin content) .

It is desirable to get sawdust from a mill that has either pine or oak sawdust, rather than chips from a company who is chipping down an urban street with mixtures of wood species. Secondly, composted sawdust containing maple or walnut that is properly matured is safe for use on blueberry. However, materials composted for a long periods of time can have a high pH of 7.0 or higher. Generally the literature points out that sawdust does not affect pH of the soil, particularly if it is less that two years of age.

It is my general recommendation to use 2 year or older sawdust from pine or oak. With anticipation I'd buy fresh sawdust and put it into pile of 5 to 6 feet, add some nitrogen, and keep it for one to two years. Chips may be useful if the same process is used, but for newly established plants, sawdust is best.

Micro Irrigation and Fertigation

Source: Dr. Richard C. Funt, Horticulture & Crop Science, OSU

Recently, there were two good articles in a national fruit magazine about trickle irrigation (micro irrigation) and fertigation (micro irrigation plus fertilizer injection) for tree fruits. These articles, plus the research in Ohio emphasize the benefits of micro irrigation, especially to the newly planted, high density apple or peach orchard.

For newly planted trees, install the irrigation system and apply granular fertilizer as calcium nitrate, potassium nitrate, or other nitrogen to the soil within seven to 10 days of planting. Use irrigation to supply water to the root zone as needed by placing emitters 12 to18 inches away from the tree. Monitor the wetting pattern to be sure that 50% of the root zone is receiving water. Increase or decrease the length of time the system is running to create the wetting pattern. Be prepared to turn the system on in early May, if necessary.

Fertigation can begin in the second year after planting. However, most trees will benefit from ground fertilizer applications or compost because the root system may not be fully developed to obtain optimal nutrition from fertigation. Fertigation, in the third and consecutive years, appears to be beneficial, particularly with the injection of nitrogen and potassium as the leaves and fruit develop during the dry

summer months. Reduce the normal nitrogen amount by 50% when using fertigation on mature trees throughout the season. Potassium nitrate may be a preferred material for fertigation.

Use tensiometers at a depth of 12 and 18 inches in the soil to monitor soil moisture. Ohio research, which was confirmed by similar work in Israel in the mid 1990's, indicates that optimal fruit and leaf growth will occur between 20 and 25 centibars as long as 50% of the root zone is receiving irrigation or fertigation. Readings of one to 10 centibars over the summer months for three years showed very low tree performance and often tree death. The use of micro sprinklers on heavy soils under the entire tree canopy may be responsible for this response. However, the Ohio research points out that monitoring the soil moisture in the root zone is both practical and economical particularly in orchards between one and ten years of age.

Fertigation with nitrogen in sandy soils can decrease the soil pH below the emitter. However, as the article stated, as roots are spread over a large area, there was no reduced yield, and the lower pH effect was minimal. While not significant, irrigation with micro sprinklers tended to increase pH lower in the soil profile over several years. Thus, a slow but beneficial pH increase can affect the uptake of nutrients deeper in the soil because of an improved pH. This could be a benefit in dry years as roots take water from the lower soil profile. The article on fertigation also indicates the beneficial response of irrigation and potassium uptake in plants.

In conclusion:

1.) Use irrigation in newly planted orchards.
2.) Apply granular fertilizers to the soil early in the growing season for at least the first two years.
3.) Use fertigation in the second or third years, but reduce the total nitrogen amount by as much as 50% as trees come into bearing to reduce excessive shoot growth.
4.) Always monitor the soil moisture at the root zone from May to September for optimal plant response.
5.) Always monitor the soil pH and elemental content. Always take leaf samples and make appropriate applications of nutrients.
6.) Always design the irrigation system for a uniform distribution of water and nutrients to the plant. Always understand the wetting pattern created by the system.
7.) In most years, stop fertigation in mid-July to early August, but continue watering until mid-September under high evaporation, low rainfall conditions, and high crop load.

Goal Herbicide
Section 18 Approved for Strawberry

Source: Dr. Richard C. Funt, Horticulture & Crop Science, OSU

The USEPA has granted under section 18 of FIFRA to the Ohio Department of Agriculture for the use of Goal2XL to control broadleaf weeds in strawberries in Ohio. Goal 2XL is manufactured by Rohm and Haas Chemical Company. One to two ground applications of Goal are allowed, but shall not exceed two pints (0.5 lbs ai/acre) per acre per year. Do not apply within 123 days of harvest.

Goal may be applied from:

June 20 to July 20, 1999 at renovation after leaves have been removed by mowing, but before new leaves emerge; generally within 48 hours after mowing

and/or from:

October 15 to December 15, 1999 when plants are dormant; generally plants are dormant after three occurrences of 24 to 26 degrees F.

Goal 2XL alone will provide postemergence control of common groundsel and wood-sorrel (oxalis) at the 2 to 4 leaf stage at 1 pint/per acre in at least 20 to 40 gallons of water. It can be tank mixed with Devrinol. Groundsel is a difficult weed to control and a second application in November or December may be necessary to reduce weed pressure.

Goal 2XL can cause plant damage if applied before transplanting. However, once the plant has hardened off and has increased the size of the roots, damage may be less. In all stages of growth, plant damage can be reduced when the application is made according to the label and when the plant is not under stress from heavy rain, drought, excessive fertilizer, or hail damage.

Growers are advised to apply other foliar sprays after Goal 2XL sprays. Generally apply 2, 4-D 5 to 7 days before mowing of leaves and Sinbar after mowing but within 48 hours of mowing. We advise applying Goal first after leaf removal and Sinbar approximately 24 hours after Goal as a single application.

Ohio growers who used Goal in 1998 were generally pleased with the rates and timing as described above. Weed control was generally good to excellent. We are grateful to John Price, Regional Representative for Rohm and Haas, the Ohio Fruit Growers Society and Ohio Department of Agriculture for their support of this special label.

Northern Ohio Scab Watch

SpecWare 4.0 calculations

Modified Mills Method -
Apr 15 - light infection
Apr 16 - light infection
Apr 22 - light infection

SkyBit Apple Scab Product

Apr 16-18 - possible infection & damage
Apr 20 - possible infection & damage
Apr 22-24- possible infection & damage forecasted

Orchard Observations

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

Apple: 4/14 to 4/21

RBLR: 13
STLM: 2210
Pink Bud stage in Delicious

Peach:

OFM: 0
Past Full Bloom

Site: Erie County
Source: Ted Gastier, OSU Extension Agent

Apple: 4/14 to 4/21

RBLR: 4.5
STLM: 207
Half-Inch Green to Pink, dependent upon variety.

Peach:

OFM: 0.5
RBLR: 1.5
Mostly Bloom, some at Petal Fall

Site: Wooster
Source: Dr. Dave Ferree, Professor of Horticulture & Crop Science

Fantasia nectarine - Bloom to Petal Fall
Apple - Tight to Open Cluster

Site: Licking County
Source: Dr. Dave Ferree

Apples at Pink, with rapid advance expected.

Degree Day Accumulations for Selected Ohio Sites January 1, 1999 to date indicated

	Actual DD Accumulations April 21, 1999		Forecasted Degree Day Accumulations April 28, 1999			
Location	**Base 43° F**	**Base 50° F**	**Base 43° F**	**Normal**	**Base 50° F**	**Normal**
Akron - Canton	221	82	303	310	117	131

Cincinnati	382	147	512	542	228	251
Cleveland	243	95	313	291	116	123
Columbus	355	146	463	396	205	175
Dayton	308	118	415	401	176	179
Elyria	254	113	334	310	144	132
Fremont	183	72	266	262	107	108
Mansfield	235	85	325	301	126	128
Norwalk	235	97	319	270	132	112
Toledo	216	77	295	256	110	106
Wooster	253	98	255	282	137	113
Youngstown	190	68	263	272	99	113

Phenology

	Range of Degree Day Accumulations	
Coming Events	**Base 43° F**	**Base 50° F**
Rosy apple aphid nymphs present	91-291	45-148
Green apple aphids present	127-297	54-156
Oriental fruit moth - 1st adult catch	129-587	44-338
Spotted tentiform leafminer - 1st oviposition	141-319	48-154
European red mite egg hatch	157-358	74-208
Redbanded leafroller - 1st flight peak	180-455	65-221
Spotted tentiform leafminer - 1st flight peak	180-44	65-275

Thanks to Scaffolds Fruit Journal (Art Agnello)

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