scaffolds

Update on Pest Management and Crop Development

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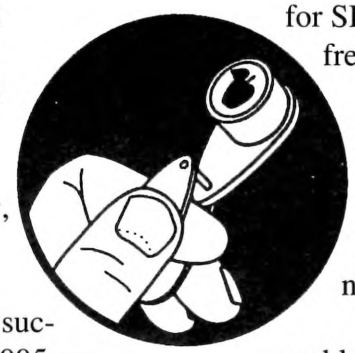
DISEASES

THE YEAR IN PREVIEW

APPLE SCAB FUNGICIDE STRATEGIES FOR 2006

(David Rosenberger, Plant Pathology, Higland)



❖❖ Most apple growers who successfully controlled apple scab in 2005 can plan to use the same programs in 2006. There have been no major changes in registrations, and no new fungicides have been registered for scab control in the past year. The remainder of this article provides a quick review of strategies and fungicide options for early season apple disease control.

As noted last year, orchards where the SI fungicides are no longer effective against apple scab must be managed using more conservative prebloom spray programs than might otherwise be recommended. A conservative approach is needed because we have no fungicides that can completely arrest a developing scab epidemic in SI-resistant orchards. If scab gets started before bloom in SI-resistant orchards, the remainder of the season can turn into a scab-control nightmare should seasonal weather patterns favor scab development.

To ensure that no primary scab will become established, the scab control program in SI-resistant orchards should include all of the following:

• The first fungicide must be applied BEFORE the first scab infection period after budbreak. (A copper spray can count as the first fungicide.) Getting that first spray applied before the first infection period is essential even for SI-resistant orchards that were "scab-free" last year.

• Any time during the prebloom period when rains are predicted and the adequacy of fungicide residues from earlier sprays is questionable, fungicide coverage should be renewed AHEAD of the rains.

• Mancozeb at 3 lb/A applied at roughly 7-day intervals will usually provide good scab control in a clean orchard, but in SI-resistant orchards the rate/A for mancozeb should be increased to 4.5–6 lb/A during the critical period between tight cluster and petal fall. Or combinations of mancozeb at 3 lb/A plus 1.5–3 lb/A of Captan 50W (or an equivalent amount of another captan formulation) can be used. Or Sovran or Flint can substituted for the higher rates of contact fungicides in one or more sprays after tight cluster.

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• If heavy rains remove fungicide residues and wet weather is expected to continue unabated for several more days, it may be necessary to apply mancozeb or captan in the rain to prevent infections from becoming established.

Following are general observations on usefulness of the common scab fungicides:

1 - Mancozeb fungicides at 3 lb/A are probably still the cheapest option for prebloom scab control, but they must be applied at 5–7 day intervals during rainy weather rather than at 10-day intervals as was common with SI+mancozeb combinations.

2 - If one compares 3 lb/A of Captan 50W (or the equivalent of another formulation) with 3 lb/A of mancozeb, captan will almost always provide better scab control than mancozeb. Captan usage is limited, however, by captan's higher pricing, its incompatibility with oil sprays, and its lack of activity against rust diseases. Where incompatibility with oil is not a factor, combinations of mancozeb and captan provide the "best of both worlds" in prebloom scab sprays.

3 - Dodine may still work in some orchards, but don't trust it unless you've had leaf samples tested for fungicide resistance. I've seen too many crop failures that resulted from just one or two early season applications of dodine in dodine-resistant orchards.

4 - Vangard and Scala fungicides usually provide scab control similar to that provided by mancozeb at 3 lb/A. However, Vangard and Scala can both provide 48–60 hr of post-infection activity against apple scab (counting from the start of the wetting period), whereas mancozeb sprays will *provide* only 18–36 hr of "kickback" activity when counting from the start of wetting periods, with the longer duration limited to colder infection periods. Vangard and Scala do not redistribute well, so combinations of mancozeb at 3 lb/A plus either 3 oz/A of Vangard or 5 fl oz/A of Scala are recommended when these products are used. A 2005 trial in the Hudson Valley verified that Vangard and Scala used at these rates will still provide at least 56 hr of postinfection activity.

5 - Flint and Sovran are good protectant fungicides that provide better scab control than mancozeb or captan used alone. They can also arrest spore production if visible scab lesions are present in trees. However, they will not stop epidemics as effectively as SI fungicides did in SI-sensitive orchards if they are applied after scab infections are established.

6 - Most NY apple orchards should still be receiving an SI fungicide in combination with either captan or mancozeb at petal fall and first cover. SI's applied at that timing will provide significant suppression of powdery mildew as well as postinfection activity against any scab and rust infections that may have slipped through during the prebloom and bloom sprays. Using SI's in two applications after bloom should minimize selection pressures for SI-resistant scab while still maximizing the benefits that SI's provide for apple disease management programs.❖❖

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REDUCE SCAB REDUX

SECOND OPINION ON SCAB INOCULUM REDUCTION
(Dan Cooley, Plant Pathology, University of Massachusetts, Amherst)

❖❖ After I read Dave Rosenberger's article on urea applications for scab inoculum suppression in last week's Scaffolds, I noted that we had differing opinions about the usefulness of orchard floor treatments. Dave and I generally agree on apple disease management strategies, but we both like a good debate. After an exchange of e-mails, Dave suggested I should publish my alternative view on the value of orchard floor treatments as a follow-up article in Scaffolds because he agreed that my alternative perspective had considerable merit.

Basically, we agree that urea treatments and/or leaf chopping will suppress the amount of overwintering inoculum in an orchard. In the original New Hampshire study, urea applied in spring reduced scab spores by 66%. If all the leaves could be chopped, including the ones under the trees in the row, then spore production dropped by 80 to 90%. If the leaves under the trees were left untouched but the rows are chopped, it still reduced spores by 50 to 65%. In orchards that have overwintering scab, this is enough to make a real difference in the efficacy of older protectant chemicals and in resistance management.

However, when the presence/absence of overwintered scab is questionable, the benefit of orchard floor treatments isn't as clear. If a grower is certain that there is no scab from the previous year, then obviously there's no benefit to chopping or spraying urea. However, often there's uncertainty about levels of foliar scab that might be present in October, even where fruit at harvest looked clean. In surveys of leaves on the tree after harvest but before leaf fall, it isn't unusual to find active scab in orchards that had no fruit scab. Sometimes a dry summer followed by a wet fall will stimulate new, active infections. DMI fungicides may stop fungal growth without killing it, so scab infections that were held in check by Rubigan, Nova or Procure during the growing season can start to grow again in late autumn after leaves lose the natural (ontogenic) scab resistance that is present in mature leaves during summer. In orchards where scab has started to shift towards DMI resistance, one might expect more of this late season development. One way to be certain that scab is not present in a block is to do a systematic count in the fall, the so-called PAD analysis, but few growers or consultants have adopted this approach. So even an apparently "scab free" orchard may have low levels of infection.

As a result of this uncertainty, orchard floor treatments even in those blocks where there was no apparent scab problem at harvest might be useful. They would be a hedge against green tip infections, would reduce the chance that an early-season "mistake" could develop into an epidemic, and would reduce the selection pressure for resistant scab. Over several seasons, the cumulative effect for resistance management could be significant.

Dave has countered that major scab epidemics in individual orchards are usually presaged by the presence of scab on 1–5% of fruit in the previous season. Thus, a noticeable up-tick in fruit scab incidence can serve as an indicator for the high-risk blocks that will benefit most from inoculum reduction practices. He suggests that routine dormant applications of urea or leaf chopping would be expensive and that the urea might drive up nitrogen levels, possibly to levels that would harm fruit quality in McIntosh. In other words, without a clear indication that orchard floor treatments are tackling a known scab problem, the cost is too high, especially since a full-season fungicide program will still be needed anyway.

The flip side of that argument is that orchard floor treatments are roughly equivalent in terms of expense, and haggle, to an extra scab spray. One

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way of looking at whether or not an apparently *clean* orchard should get urea or leaf chopping might be to ask "If an extra treatment would add measurable insurance to scab management, and would also help maintain efficacy of systemic fungicides, would I use it?" In the absence of a good estimate of how much risk is being eliminated with dormant orchard floor treatments, that's a tough question. And one that pathologists can debate.❖❖

INSECTS

DO YOU KNOW THE WAY?

DE-SCALING WOES
(Peter Jentsch, Entomology, Highland)

❖❖ While the successes and shortcomings of last year's pest management program are still fresh in our minds, it seems an appropriate time to reflect on apple blocks that had specific insect problems. Before making the first application that propels us into a new growing season, we should consider strategies to correct the insect shortcomings of last season. One such insect that seems to be slipping through the cracks of NY pest management programs is the San Jose scale. The most effective time to manage this insect continues to be at the onset of the season.

San Jose scale (SJS), *Quadraspidiotus perniciosus* (Comstock), overwinters in the adult form and is well protected from both the onslaught of winter and our diligent IPM pest management practices. The shift away from traditional mite management practices of early oiling for overwintering eggs has allowed for high survival of the overwintering SJS adults. The loss of mid-season Lorsban, Penncap-M, and the reductions or shifts in organophosphate use during the mid- to late season has provided ample survival opportunities for this pest. Since the onset of resistance of obliquebanded leafroller (OBLR) to organophosphates, the use of alternative materials such as SpinTor and Bt for OBLR management has allowed SJS crawlers, which are unaffected by these chemistries, to infest fruit and build in great numbers on apple branches.

Much has been written about the biology and life cycle of this pest and I refer you to last year's Scaffolds article on SJS dated April 11, 2005 (Vol. 14, No. 4: http://www.nysaes.cornell.edu/ent/scaffolds/2005/050411.html). The emphasis of this article is to focus on management of the overwintering 'black-cap' stage of San Jose scale. Data resulting from trials conducted in 2004 at the Geneva Experiment Station by H. Reissig and at the Hudson Valley Lab in 2005 strongly support the management of the pest at this stage of its life cycle, for a number of reasons.

First, by controlling the overwintering stage, growers are allotted an additional management window in the early spring for developing resistance management strategies through the rotation of the most efficacious materials available. Secondly, by reducing the overwintering population, more effective management of successively smaller numbers of emerging nymphs in the subsequent generations can be achieved. Finally, the use of oil as an additive to the materials employed to manage summer generations, such as Assail and Esteem, is in conflict with the use of summer fungicide programs (especially those using Captan). The use of summer oil has also been shown to cause fruit phytotoxicity when applied at the more effective 2% rate later in the season. However, the 1% rate of highly refined oil has not been shown to cause phytotoxicity when used in summer mite management programs, although a tendency for increased "scarf skin" is present in some varieties such as Red Rome and Jonathan (A. Agnello, Scaffolds May 30, 2000, Vol. 9, No. 11).

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The data in Tables 1 & 2 reflect the efficacy of some materials presently used for overwintering SJS management. In 2005, the results demonstrated that Damoil at 3% applied at green tip, 2% Damoil applied at half-inch green, and Lorsban 4EC at 16.0 oz/100 gal applied at half-inch green gave the best pre-bloom control of the overwintering 'black-cap' stage. Table 1 represents 'black-cap' mortality observed on the cuttings of 2-3 yr wood using 15X magnification. Esteem 35WP did not show dramatic signs of SJS adult mortality, as would be expected by this insect growth regulator. Scouts examining for black-cap mortality post-application should take note of this indication of Esteem's mode of action. The neonicotinoid Assail 70WP demonstrated slower activity, not providing significant mortality until 28 days post-application.

Table 2 represents the 1st generation crawlers that infest fruit and 1st-year wood. Damoil at 3% applied at green tip, 2% Damoil applied at half-inch green, Lorsban 4EC at 16.0 oz/100 gal applied at half-inch green, and Esteem 35WP at 1.0 oz/100 gal applied at half-inch green, all gave the best control of 1st generation fruit damage.

Warm weather is on the horizon and green tissue is developing. If SJS was a problem in 2005, then 'de-scaling' should be on this year's management agenda. Developing a resistance management program for San Jose scale beginning this spring with the most effective management strategies available is a good incentive to start the season on a progressive scale.❖❖

Table 1. Evaluation of insecticides for controlling San Jose scale on apple (1), NYSAES, Hudson Valley Lab, Highland, NY 2005.

Treatment/ Formulation	amt/100 gal	Timing	% mortality per # of days post application				
			7 d	14 d	21 d	28 d	45 d
1. Damoil	3.0 gal	GT	100.0c	100.0c	100.0c	100.0c	100.0c
2. Damoil	2.0 gal	HIG	100.0c	100.0c	100.0c	100.0c	100.0c
3. Lorsban 4E	1.0 pt	HIG	100.0c	100.0c	100.0c	100.0c	100.0c
4. Esteem 35WP	1.25 oz	HIG	48.5b	41.3b	37.5a	51.4b	59.4b
5. Assail 70WP	1.25 oz	HIG	51.6b	44.6b	78.4b	94.1c	99.9c
9. Untreated	—	—	2.7a	23.0a	37.5a	36.0a	34.9a

1 - Data from 'Empire' cultivar. Microscope (20X) evaluations made of 2–3 year-old cuttings on 18, 25, April, 2, 9, 26 May for SJS black cap population mortality.

Table 2. Evaluation of insecticides for controlling San Jose scale on apple (1,2), NYSAES, Hudson Valley Lab, Highland, NY 2005.

Treatment/ Formulation	Amt/ 100 gal	Timing	% infested fruit	Avg # caps/ fruit	Live SJS caps/ fruit	% inf. 1st-yr shoots	# caps/ cm	# live SJS/ shoot
1. Damoil	3.0 gal	GT	0.0a	0.0a	0.3a	1.1a	0.1a	0.0a
2. Damoil	2.0 gal	HIG	0.9a	0.3ab	1.3a	29.2a	1.1a	0.3a
3. Lorsban 4E	1.0 pt	HIG	3.0ab	1.5ab	1.2a	17.1a	0.3a	0.7a
4. Esteem 35WP	1.25 oz	HIG	1.4ab	1.3ab	2.6a	15.0a	0.6a	1.1a
5. Assail 70WP	1.25 oz	HIG	31.2bc	29.6cd	6.9ab	37.8a	1.4ab	5.7ab
9. Untreated	-	-	95.9d	277.0d	142.2c	98.9a	30.0c	97.9c

1 - Data from 'Empire' evaluation on 11 July for 1st generation SJS black cap population.
1/4 inch GT on 7 April, HIG on 12 April, Pink on 26 April, Bloom on 8 May, PF on 19 May @ 80% PF of Empire. 310DD crawler emergence timing from adult biofix on 14 June, following 10d application on 24 June. 310DD crawler emergence timing for 2nd generation on 29 July.
2 - Means separation by Fishers Protected LSD (P=<0.05). Treatment means followed by the same letter are not significantly different.

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–4/10/06):	132	45
(Geneva 1/1–4/10/2005):	84	30
(Geneva "Normal"):	109	46
(Geneva 1/1–4/17 Predicted):	190	71
(Highland 3/1-4/10/06):	111	48

Coming Events:	Ranges(Normal±StDev):	
Green apple aphids present	111–265	38–134
Green fruitworm flight peak	94–200	34–92
Rosy apple aphid nymphs present	134–244	56–116
Pear thrips in pear buds	118–214	50–98
Spotted tentiform leafminer 1st catch	112–236	39–113
STLM 1st oviposition	143–273	58–130
Obliquebanded leafroller larvae active	158–314	64–160
McIntosh at green tip	93–145	36–62
McIntosh at half-inch green	153–197	65–91

CHEM NEWS

AVAUNT-AGE

CHEM NEWS – AVAUNT USE NOW LEGAL ON LONG ISLAND

❖❖ The New York State Department of Environmental Conservation has registered a revised label for DuPont Avaunt Insecticide (EPA Reg. No. 352-597) in New York State. The revised label removes the statement "Not for Use or Sale in Suffolk and Nassau Counties, Long Island, New York" and represents a major change in labeled use pattern for the active ingredient indoxacarb.

Avaunt is registered for use as a foliar spray for the control of lepidopteran pests on apples and pears, and cannot be used on crops labeled for "U-pick" by consumers.❖❖

PHENOLOGIES

Geneva:

	4/10	4/17 (Predicted)
Apple(McIntosh):	late silver tip	half inch green
Apple(Red Delicious):	silver tip	half inch green
Pear:	late swollen bud	bud burst to green cluster
Sweet cherry:	swollen bud	bud burst
Tart cherry	swollen bud	bud burst
Plum:	dormant	bud burst to green cluster
Peach:	swollen bud	half inch green

Highland:
Apple (McIntosh/Ginger Gold/Empire): 1/2" green
Apple (Golden Delicious/Red Delicious/Honeycrisp): green tip
Pear (Bartlett): bud burst
Pear (Bosc): swollen bud
Peach: 1/2" green
Plum (Stanley): swollen bud
Plum (Italian): bud burst
Apricot: 25–50% bloom

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NOTE: Every effort has been made to provide correct, complete and up-to-date pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly, and human errors are possible. These recommendations are not a substitute for pesticide labelling. Please read the label before applying any pesticide.

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